State of Delaware
2008 Combined Watershed Assessment Report (305(b)) and Determination for the Clean Water Act Section 303(d) List of Waters Needing TMDLs

Department of Natural Resources and Environmental Control
April 1, 2008

Preface

The State of Delaware 2008 Combined Watershed Assessment Report (305(b)) and Determination for the Clean Water Act Section 303(d) List of Waters Needing TMDLs provides a statewide assessment of surface water and ground water resources, highlights Delaware's initiatives in water resources management and pollution control and provides a list of waters that need TMDLs to meet water quality standards. The document fulfills the reporting requirements set forth under Sections 305(b) and 303(d) of the Federal Clean water Act of 1977, as amended in 1981 and 1987, and is organized in accordance with federal Environmental Protection Agency's (EPA) guidance documents.

This document summarizes statewide water quality assessments, provides an overview of major initiatives and concerns on a statewide basis, and lists waters needing TMDLs. Tables are provided which show the result of water quality analysis and designated use support findings for data from the period of September 2002 through August 2007.

There are two appendices to the report. Appendix A is the data provided by citizen monitoring programs. Appendix B contains comments and responses to the Tentative Determination for the State of Delaware 2008 Clean Water Act Section 303(d) List of Waters Needing TMDLs.

Assessments for the Delaware River and Bay are completed by the Delaware River Basin Commission (DRBC).

For 2008, an addendum of newly available groundwater statistics and information is being prepared and will be published in the immediate future. It is anticipated that in 2010, the groundwater data will be included in the April 1 submission.

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Part I: Executive Summary

Executive Summary

As recently as 1975, Delaware routinely experienced serious water pollution and public health problems as a result of the discharge of untreated sewage and wastes. Since then, as a result of voluntary efforts, regulatory actions, and significant private and public investments in wastewater treatment facilities, localized improvements in water quality have been achieved.

The need for additional cleanup and pollution prevention continues. The focus of water quality management has shifted from point source discharges (end-of-pipe) to decreased stream flows and nonpoint source problems, such as urban and agricultural runoff, erosion, and sedimentation. Unaddressed, these problems lead to poor habitat conditions for fish and other aquatic life, decreased enjoyment of our surface waters for recreation, and unhealthy conditions for those surface waters upon which we rely for drinking water supply and other domestic uses.

Water Quality Monitoring

The DNREC recognizes the need to use its personnel and financial resources efficiently and effectively. To that end, surface water quality monitoring is conducted in a manner that focuses available resources on the Whole Basin Management concept. The Whole Basin Management Program in Delaware operates on a 5-year rotating basis. This new approach enables the DNREC to comprehensively monitor and assess the condition of the State environment with due consideration to all facets of the ecosystem.

Elements of the State's specific Surface Monitoring Program include:

TMDL-Related Monitoring

General Assessment Monitoring

Toxics in Biota Monitoring

Toxics in Sediment Monitoring

Biological Assessment Monitoring

Delaware Rivers and Lakes

Delaware has classified more than 2,509 miles of rivers and streams, and 2,954 acres of lakes and ponds that have been classified using a rating system called for in the Federal Clean Water Act. The classification system is keyed to a management program designed to protect uses of the waters (referred to as "designated uses") for such purposes as drinking water supply, recreation, and the propagation of fish, aquatic life and wildlife. These designated uses serve as Delaware's water quality goals for specific watersheds. In order to protect those uses, a comprehensive set of chemical, biological, and habitat standards have been promulgated. Designated uses and standards are embodied in the State of Delaware Surface Water Quality Standards as amended on July 11,2004.

The Department of Natural Resources and Environmental Control has found that 88% of Delaware's rivers and streams do not fully support the swimming use and 97% do not fully support the fish and wildlife use. Most of these waters do not meet the standards because of nonpoint source pollution impacts.

Ponds and lakes in Delaware exhibit many of the same problems as rivers and streams. However, ponds and lakes also serve as "catch basins" for a variety of pollutants that are washed from the land and the air into these water bodies. Two indicators which show the tendency for lakes and ponds to accumulate pollutants are fish consumption advisories due to toxic substances in the fish, and the extent of nutrient enrichment. Nutrient enrichment can lead to excessive weed and algae growth, reduced water clarity, and decreases in population of aquatic life and wildlife. The department has found that 44% of Delaware's fresh water ponds and lakes do not fully support the swimming use and 89% do not fully support the fish and wildlife use.

Wetlands in Delaware

Wetlands have many important functions and values to society. They provide fish and wildlife habitat, help maintain water quality, and provide indirect socioeconomic values such as flood and storm water damage protection. With the implementation of federally mandated regulations known as Total Maximum Daily Loads (TMDLs) to reduce pollutants into water bodies, wetland preservation is considered one of the most important strategies for achieving the pollution reduction efforts necessary to meet water quality standards.

Wetlands comprise a significant portion of Delaware's water resources covering over 300,000 acres (about 470 square miles or 23%) of the state. Throughout the state a wide diversity of wetland types occur including both tidal and nontidal wetlands. While some wetlands are directly connected or adjacent to other surface waters such as salt marshes and floodplains, others occur as isolated areas surrounded by uplands such as forested flats and Delmarva Bays. Preserving the abundance, quality, diversity and proportion of different types of wetlands in the landscape is essential to protecting the natural resources and waters of Delaware. Currently the State of Delaware is actively working in each of these areas to protect our high quality wetland resources and restore degraded systems on the watershed scale.

Bacteria (Pathogen Indicators)

As the name implies, "indicator bacteria" are indicators of pathogenic (disease causing) bacteria and viruses. Sources of indicator bacteria (enterococcus and coliform) are widespread. The sources of most concern are those of human origin such as raw or inadequately treated sewage. Wildlife and animal operations such as feedlots can also be significant sources of indicator bacteria, although they represent less of a risk to human health compared to human wastes.

High levels of bacteria pose an increased risk of illness to shellfish consumers, swimmers, and others who may come in contact with contaminated waters. Approximately 88% of Delaware's rivers and streams, 44% of ponds and lakes, and 49% of estuarine waters (not including the Delaware River and Bay) were found to have bacteria concentrations above the levels considered acceptable for primary contact recreation (swimming, bathing, and water skiing). Many of Delaware's estuarine and tidal waters exhibited bacteria levels above those considered safe for the harvesting and consumption of shellfish. Waters most impacted include the tidal tributaries of the Delaware Bay and portions of Delaware's Inland Bays.

Nutrient Enrichment

Eutrophication of surface waters is a natural process, spanning hundreds to thousands of years, resulting from natural erosion and the breakdown of organic material. Over these extended periods many lakes and ponds under natural conditions would be expected to fill in with sediments and organic materials, eventually becoming marshes and meadows. Lakes and ponds in various stages of eutrophication are considered a natural feature of Delaware's environment. Activities linked to soil erosion, domestic waste disposal (on-site septic systems), and runoff, can greatly increase the rate and amount of nutrients reaching lakes and ponds, accelerating the eutrophication process. Characteristic symptoms of nutrient enriched water bodies include murky green waters or nuisance plant growth. Delaware waters are generally considered to be impacted by nutrients (nitrogen and phosphorus).

Fish Consumption Advisories

Toxic substances such as Polychlorinated Biphenyls (PCB's), metals and pesticides persist in the environment and accumulate in the flesh of fish. The Department of Natural Resources and Environmental Control and the Department of Health and Social Services issued updated fish consumption advisories for waterbodies in the State during 2007. See the table in Section III, Chapter 4.

National Methylmercury Fish Consumption Advisory

On January 12, 2001, EPA and the Food and Drug Administration (FDA) issued concurrent national fish consumption advisories recommending restricted consumption of freshwater coastal and marine species of fish due to methylmercury contamination. EPA's advisory targeted women of childbearing age and children who may be consuming noncommercial freshwater fish caught by family or friends. The advisory specifically recommends that women who are pregnant or could become pregnant, women who are nursing a baby, and their young children, should limit consumption of freshwater fish caught by family and friends to one meal per week unless the state health department has different advice for the specific waters where the fish are caught. For adults, one meal is six ounces of cooked fish or eight ounces uncooked fish; for a young child, one meal is two ounces of cooked fish or three ounces of uncooked fish.

General Changes or Trends in Water Quality

As a result of water quality protection programs that are in place in Delaware, surface water quality in general has remained fairly stable in spite of increasing development and population growth. Impacts to waters are generally the result of past practices or contamination events, activities that are not regulated nor otherwise managed, or changes that are occurring on a larger regional scale. For example, air pollutants from sources outside of Delaware contaminate Delaware's surface waters via rainfall.

Improvements in water quality have been documented in localized areas where a discharge was eliminated or better treatment installed. Basin-wide water quality improvements in waters that are being impacted by historical contamination and nonpoint pollution sources are very difficult to detect over a short period of time. Targeted monitoring over long time periods (years) is necessary in order to detect changes.

Although Delaware's surface water quality may not have changed significantly over the last several years, there have been many improvements made in watershed assessment approaches and methodologies. Additionally, many water quality criteria are stricter as a result of amendments to the State's Water Quality Standards. Therefore, we have become more proficient at identifying water quality problems and, at the same time, are calling for higher quality waters.

The stability of Delaware's surface water quality is likely the result of increased efforts to control both point and nonpoint sources of pollution. In addition to the significant investments in wastewater treatment technologies previously mentioned, many private business interests are investing in practical and cost-effective nonpoint source pollution control practices (Best Management Practices) on farms, residential developments, and commercial and industrial sites. Likewise, public agencies such as the Delaware Department of Transportation are investing revenues in improved storm water management practices and wetlands creation to mitigate the impacts of maintenance and new highway construction activities.

Ground Water Quality

Ground water provides an abundant, high-quality, low-cost supply of water for residents of the State of Delaware. The latest records indicate that more than 40 billion gallons of water were withdrawn in 1995 from ground water sources, a 25% increase from the 1990 withdrawal of 32 billion gallons. The domestic needs of approximately two-thirds of the State's population are met with ground water provided by both public and private wells. Most of the water used for agriculture, Delaware's largest industry, and self-supplied industrial use, is also derived from ground water sources. These figures will be updated during the next reporting cycle once the next USGS water use values have been compiled.

Ground water in Delaware is a relatively vulnerable resource due to the State's shallow water table and high soil permeability. The shallow unconfined aquifer is the most vulnerable to contamination and has been made unusable in many localized areas. If ground water resources are improperly managed or inadequately protected, many of the advantages previously mentioned may be lost. Contaminants in ground water originate from anthropogenic sources such as domestic septic systems, landfills, underground storage tanks, agricultural activities, chemical spills and leaks, and many other sources and activities. As population and industrialization of the State continues the standards of purity of ground water are more frequently exceeded over larger areas of the State.

The deeper confined aquifers in the State are also susceptible to contamination. This is because all but one of the confined aquifers in Delaware subcrops beneath the unconfined aquifer and all aquifers receive recharge from leakage from overlying aquifers. Consequently, contamination of the ground water in the surficial unconfined aquifer could eventually affect ground-water quality of the underlying confined aquifers. Studies in southern New Castle County have demonstrated the long-term susceptibility of these deeper aquifers where they subcrop beneath the unconfined surficial aquifer.

The Department is responsible for taking appropriate action to eliminate existing ground water contamination problems and reduce the likelihood of future ground water contamination. This is being accomplished by both regulatory programs (e.g., Underground Injection Control, Underground Storage Tank, RCRA, etc.) and non-regulatory programs (e.g., Pollution Prevention, Non-point Source, etc.).

Future Needs and Activities to Improve Environmental Quality of the State

The State of Delaware will continue to focus on nonpoint source pollution problems such as urban and agricultural runoff, erosion and sedimentation and ground water contamination. The Department of Natural Resources and Environmental Control will emphasize pollution prevention, education, and both voluntary and regulatory efforts to improve the quality of surface and ground water resources. Additional research and assessment efforts will be necessary to better understand the response of aquatic systems to certain pollutants. Additionally, because of the relationship of stream flow to ecological health, the development of a surface water withdrawal/minimum stream flow maintenance policy is a priority. Improved assessment and management of biological health and physical habitat quality are also priorities.

The health of Delaware's aquatic systems and ground water resources will be assessed and managed within the framework of the Department of Natural Resources and Environmental Control's Whole Basin Management Program. This program calls for the Department, in partnership with other governmental entities, private interests, and all stakeholders, to focus its resources on specific watersheds and basins (groups of watersheds) within specific time frames.

Five basins and 45 watersheds have been delineated (see figure I-1 entitled "Delaware Watersheds and Basins"). The Whole Basin Management activities in the State started within the Piedmont Basin in 1996, and were followed by the Chesapeake Basin in 1997, the Inland Bays in 1998 and the Delaware Bay Drainage Basin started in 1999. Similar activities have begun for the Delaware Estuary.

In addition to the planning and preliminary assessment steps, Whole Basin Management will include intensive basin monitoring, comprehensive analyses, management option evaluations, and resource protection strategy development. Public participation and ongoing implementation activities will occur throughout the Whole Basin Management process.

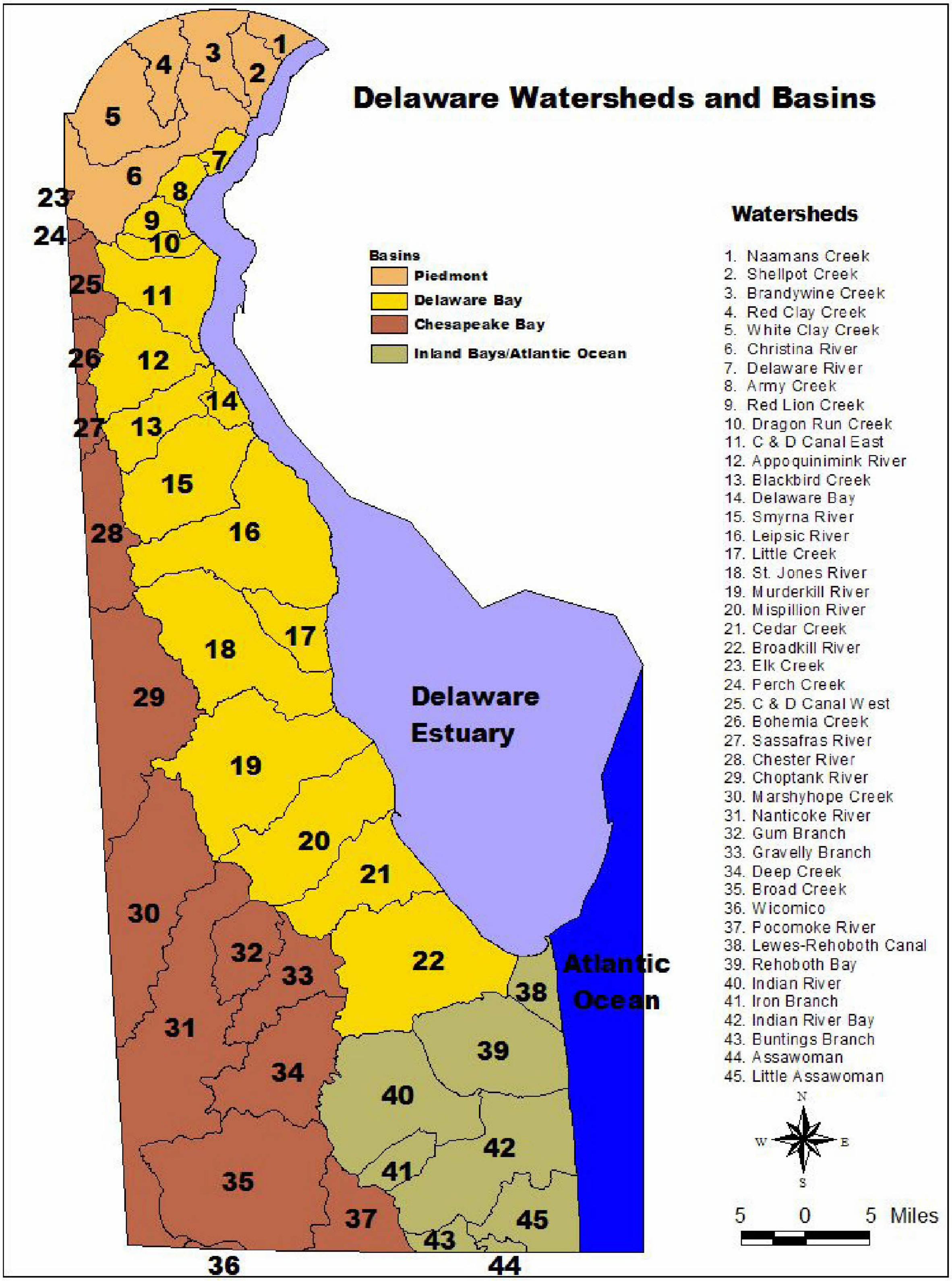
Delaware Watersheds and Basins
Basins
Piedmont
Delaware Bay
Chesapeake Bay
Inland Bays/Atlantic Ocean
Watersheds
1. Naamans Creek
2. Shellpot Creek
3. Brandywine Creek
4. Red Clay Creek
5. White Clay Creek
6. Christina River
7. Delaware River
8. Army Creek
9. Red Lion Creek
10. Dragon Run Creek
11. C & D Canal East
12. Appoquinimink River
13. Blackbird Creek
14. Delaware Bay
15. Smyrna River
16. Leipsic River
17. Little Creek
18. St. Jones River
19. Murderkill River
20. Mispillion River
21. Cedar Creek
22. Broadkill River
23. Elk Creek
24. Perch Creek
25. C & D Canal West
26. Bohemia Creek
27. Sassafras River
28. Chester River
29. Choptank River
30. Marshyhope Creek
31. Nanticoke River
32. Gum Branch
33. Gravelly Branch
34. Deep Creek
35. Broad Creek
36. Wicomico
37. Pocomoke River
38. Lewes-Rehoboth Canal
39. Rehoboth Bay
40. Indian River
41. Iron Branch
42. Indian River Bay
43. Buntings Branch
44. Assawoman
45. Little Assawoman
Delaware Estuary
Atlantic Ocean
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Figure 1 -1

Programs to Correct Impairments

State of Delaware Total Maximum Daily Load Program (TMDL)

Section 303(d) of the Federal Clean Water Act (CWA) requires States to develop a list of water bodies for which existing pollution control activities are not sufficient to attain applicable water quality standards (303(d) List) and to develop Total Maximum Daily Loads (TMDLs) for pollutants of concern. A TMDL sets a limit on the amount of a pollutant that can be discharged into a waterbody such that water quality standards are met.

The State of Delaware was operating under a court-approved Consent Decree that required establishment of nutrient, dissolved oxygen, bacteria, and zinc TMDLs for all impaired streams that were listed on the State's 1996 303(d) list by the year 2006. The Department met the requirements of the Consent Decree by December 2006 and completed TMDLs for all waters of the State that were impaired as the result of high nutrients, low dissolved oxygen, high bacteria levels, or high concentration of zinc.

The Department is currently developing TMDLs for PCBs and other Toxics according to a schedule provided in the 303(d) List. Furthermore, the Department is taking the necessary steps to address habitat and/or biological degradation of the State's waters according to a schedule provided in the 303(d) list.

Pollution Control Strategies

Pollution Control Strategies (PCSs) are plans to achieve the nutrient and bacteria load reductions delineated by Total Maximum Daily Loads (TMDLs). They describe the specific actions that are needed to achieve water quality standards and provide a schedule for implementing those actions. PCSs have been developed for six watersheds: Christina (Brandywine Creek, Red Clay Creek, White Clay Creek, and Christina River), Appoquinimink River, St. Jones River, Murderkill River, Nanticoke River (including Broad Creek and their tributaries), and the Inland Bays (Rehoboth Bay, Indian River and Bay, Little Assawoman Bay, and their tributaries). The PCSs, for these watersheds, have been recommended by diverse groups of citizens (including government officials) called Tributary Action Teams (TATs). These TATs work with the Department's Whole Basin Management Teams and other experts during the process of formulating the PCSs.

The Inland Bays Tributary Action Team, convened by the Center for the Inland Bays, worked diligently in providing the Department with several sets of recommendations for their PCS. This Team was facilitated by Bill McGowan of the Cooperative Extension and Joe Farrell of Delaware Sea Grant. After 6 years of deliberations with a diverse group of watershed interests, DNREC proposed a draft PCS in early 2005. Based on comments received during three public workshops and other meetings with stakeholders, a second draft was presented at three additional workshops in May 2005. Significant concerns were raised by the development community and a group of interested parties including the Delaware Farm Bureau, the Delaware Realtors Association, the Positive Growth Alliance, and the Delaware Homebuilder's Association lobbied the General Assembly to intervene in this process. The Department met with these parties for a year in order to incorporate their concerns and presented the revised Strategy at a third round of public workshops in August 2006. During these workshops, members of the scientific community raised substantive concerns relating to the buffer portion of the regulation and public outcry resulted in several legislators asking the Department to revisit the buffering issue with the Center for the Inland Bays. In April 2007, the Department attempted to promulgate the PCS regulation with the buffer portion reserved in order to move forward with the Strategy while still taking time to investigate how to successfully craft a buffer rule in lower Delaware. This approach was also not well received and the Department approached specific Sussex County developers to draft a buffer strategy for inclusion in the PCS regulations. This version is expected to go to public hearing in April 2008.

The Cooperative Extension Service convened the Nanticoke watershed's TAT. This group of concerned residents submitted their recommendations at the end of 2002. A PCS has been drafted from their recommendations and has been undergoing review within the Department. The Nanticoke River and Broad Creek PCS will also address additional actions that will be needed for Delaware to achieve its nitrogen, phosphorus, and sediment load reduction commitments as part of the Chesapeake Bay Program. The Department anticipates scheduling public workshops for the draft Nanticoke PCS once the Inland Bays PCS is successfully promulgated.

The Appoquinimink River Tributary Action Team, convened by members of the Appoquinimink School District, also worked hard to educate their community while formulating recommendations for their PCS. The Team created a speaker's bureau that made presentations on water quality for community group meetings and have a monthly column in the Middletown Transcript. A draft of the Pollution Control strategy is written and undergoing internal review. The Appoquinimink River Tributary Action Team has become a 501-c (Appoquinimink River Association) and has been very active implementing the voluntary components of PCS recommendations. The regulatory portions of this PCS will go to public hearing following the successful promulgation of the Nanticoke PCS.

In the Murderkill River watershed, the Division of Water Resources teamed with the Division of Parks and Recreation to convene the Murderkill TAT at Killens Pond State Park. This Team, formed in 2001, actually began its work before the promulgation of the Murderkill TMDL in December 2001. They held two public forums in May and another in August of 2002. Their recommendations have been drafted into a PCS and Kent County has been incorporating several of their recommendations into their County Comprehensive Plan and ordinances. The regulatory portions of this PCS will go to public hearing following the successful promulgation of the Nanticoke PCS.

The St. Jones TAT was convened by the Cooperative Extension at Delaware State University and held three public forums in early 2006 and submitted their recommendations into the Department in early 2007.

The Christina Basin was convened by the University of Delaware Water Resource Agency and met for over a year and submitted their recommendations to the Department in Fall 2007.

The Broadkill River TAT was convened by the Delaware Sea Grant Program in early 2006 and the Department expects the team to submit their recommendations in early 2008.

The Camden-Wyoming Rotary convened the Upper Chesapeake TAT in early 2006 and the Department expects the team to submit their recommendations in early 2008.

Tributary Action Teams for other watersheds with TMDLs will be formed in mid to late 2008 and include the Army Creek-Red Lion Creek-Dragon Run Creek watersheds, the Smyrna River-Leipsic River-Little Creek watersheds, the Mispillion River-Cedar Creek watersheds, and the Marshyhope Creek-Pocomoke River watersheds.

To date, Tributary Action Teams have documented 2,772 pounds per day of total nitrogen and 227 pounds per day of total phosphorus reductions to Delaware's surface waters and their proposed Pollution Control Strategies propose to reduce an additional 8,040 pounds per day of total nitrogen and reduced 133 ponds per day of total phosphorus. These measurable reductions will have significant impacts on Delaware's surface water quality.

The Delaware Nonpoint Source Program

The Delaware Nonpoint Source Program administers a competitive grant made possible through Section 319 of the Clean Water Act. The grant provides funding for projects designed to reduce nonpoint source (NPS) pollution in Delaware. NPS pollution may be defined as any pollution that originates from a diffuse source (such as an open field or a road) and is transported to surface or ground waters through leaching or runoff. Reduction of NPS pollution may often be achieved through incorporation of specific best management practices (BMPs) into project workplans. Projects may target any source of NPS pollution, but most frequently involve agriculture, silviculture, construction, marinas, septic systems, and hydromodification activities. Proposals are reviewed and evaluated, and those which are determined to meet specific requirements are eligible for funding. All projects must include matching funding from a non-Federal source totaling at least 40 percent of the overall project cost.

In addition to funding projects that achieve reductions in NPS pollution, the Delaware NPS Program is committed to addressing the issue through educational programs, publications, and partnerships with other organizations working to reduce NPS pollution in Delaware. More information and annual reports are available online at this url: http://www.dnrec.state.de.us/dnrec2000/Divisions/Soil/NPS/index.htm .

Delaware Riparian Buffer Initiative

Local, State, and Federal governments across the country have recognized the benefits of riparian buffers, including protection of water quality, preservation of flood plains, wetlands, and other important wildlife habitats. Because riparian buffers provide so many different benefits, they can be used to serve many purposes. Grassed or tree-lined buffers at the edge of farm fields trap sediment and filter pesticides and fertilizer. Buffers in urban environments slow stormwater runoff from roads and parking lots. And buffers everywhere offer food and habitat for wildlife, as well as recreational opportunities for people.

The Delaware Riparian Buffer Initiative developed a Watershed level suite of tools for prioritizing areas for riparian buffers. This GIS Planning module was developed through a series of workshops and meetings taking input from Conservation Districts, NRCS, Delaware Department of Agriculture, USFWS, and DNREC staff, facilitated by the Delaware Coastal Programs. This resulted in criteria to identify Very High, High, Medium and Low Priority areas to target for riparian buffers based upon both water quality and wildlife considerations.

The four main functions of this GIS Planning Module are:

- Identify riparian and vegetated wetland areas within a watershed that have or do not have vegetated buffers
- Review the connectivity between riparian areas and plan for riparian corridors
- Prioritize targeting for riparian buffers
- Mapping function to a standard layout design.

Delaware Nutrient Management Commission

The Nutrient Management Act established a 19-member commission that is charged to develop, review, approve, and enforce regulations governing the certification of individuals engaged in the business of land application of nutrients and the development of nutrient management plans. The members of this commission come from many different backgrounds and professions. The Delaware Nutrient Management Commission's official mission is:

"To manage those activities involving the generation and application of nutrients in order to help improve and protect the quality of Delaware's ground and surface waters, sustain and promote a profitable agricultural community, and to help meet or exceed federally mandated water quality standards, in the interest of the overall public welfare.

The mission of The Delaware Nutrient Management Commission is to:

- Consider establishing critical areas for voluntary and regulatory programs.
- Establish Best Management Practices to reduce nutrients in the environment.
- Develop educational and awareness programs.
- Consider incentive programs to redistribute nutrients.
- Establish the elements and general direction of the State Nutrient Management Program.
- Develop nutrient management regulations.

The Delaware Nutrient Management Commission is online at the following url: http://www.state.de.us/deptagri/nutrients/ .

Part II :Background

Background

This report on Delaware's water quality has been prepared pursuant to the requirement set forth in the Federal Clean Water Act of 1977 and the 1981 and 1987 amendments of Section 305(b), which require each state to prepare and submit to Congress a description of the water quality of all navigable waterways within the State on a biennial basis. The information contained herein applies to the period of September 2002 through August 2007.

Water quality assessments contained in this report were based on information available at the time of assessment. All basin assessments were prepared by the Delaware Department of Natural Resources and Environmental Control, Division of Water Resources.

State Atlas

Table 2.1 provides a brief summary of statistics regarding population and waterbody sizes for Delaware. The waterbody sizes listed in the table were obtained from a Geographic Information System (GIS) data layer that was recently developed to index state's stream waters with the U.S. EPA's Reach File 3 network of streams.

Table 2.1 State Atlas

State Population[1]	863,904
State Surface Area	1981 square miles
Number of Basins	5
Number of Watersheds	45
Total Number of Stream and River Miles	2509
Number of Perennial River Miles	1778
Number of Intermittent Stream Miles	405
Number of Ditches and Canals	326
Number of Border Miles	87
Acres of Lakes/Reservoirs/Ponds	2954
Square Miles of Estuarine Waters	841
Number of Ocean Coastal Miles	25
Acres of Freshwater Wetlands	226,530
Acres of Tidal Wetlands	127,338

1. Delaware Population Consortium Estimated Population for 2007 as of March 31, 2008, available online at: http://stateplanning.delaware.gov/information/dpc_projections.shtml .

2. Surface area for Delaware River Zone 5 and Delaware Bay provided by the Delaware River Basin Commission (DRBC), 1994 -1995 305(b) Report. For purposes of this report, Delaware reports on the Inland Bays and DRBC reports on the Delaware River and Bay.

Summary of Classified Uses

The State of Delaware Surface Water Quality Standards (as amended July 2004) contains the following Designated Use categories:

- Public Water Supply (PS)
- Industrial Water Supply (IS)
- Primary Contact Recreation (PCR)
- Secondary Contact Recreation (SCR)
- Fish, Aquatic Life, and Wildlife (FISH,WL)
- Cold Water Fish - Put and Take (CWF)
- Agricultural Water Supply (AS)
- Exceptional Recreational or Ecological Significance (ERES)
- Harvestable Shellfish Waters (SFH)

EPA recognizes that each state may have different designated use categories and definitions. In order to improve reporting consistency and interpretation of assessment information on the national level, EPA has recommended the use of the following designated use categories for reporting purposes:

- Fish Consumption
- Shellfishing
- Aquatic Life Support
- Swimming
- Secondary Contact Recreation
- Drinking Water Supply
- Agriculture

Delaware has applied EPA's categories in reporting designated use support on the following basis:

- Fish Consumption is assessed based on whether a fish advisory exists for a waterbody;
- Aquatic Life Support is equivalent to Delaware's Fish, Aquatic Life, and Wildlife designated use;
- Shellfishing is equivalent to Delaware's Harvestable Shellfish Waters designated use;
- Swimming is equivalent to Delaware's Primary Contact Recreation designated use and also includes water skiing;
- Secondary Contact is equivalent to Delaware's Secondary Contact Recreation designated use and includes activities such as boating;

- Drinking Water Supply is equivalent to Delaware's Public Water Supply designated use;
- Agriculture is equivalent to Delaware's Agricultural Water Supply designated use.

For this report, the attainment of the Clean Water Act goal of fishable waters is primarily based on Aquatic Life Support and Fish Consumption. Less than full support or attainment of either the Aquatic Life Support or Fish Consumption infers that the fishable goal of the Clean Water Act is not fully supported. Less than full support of the Swimming or Primary Contact Recreation designated use infers that the swimmable goal of the Clean Water Act is not fully supported.

Delaware's Exceptional Recreational or Ecological Significance (ERES) designation is applied to special State waters that are accorded a higher level of protection than other waters. Section 5 of the State of Delaware Surface Water Quality Standards (July 2004) contains specific criteria for ERES waters.

All the State's waters are designated for Primary Contact Recreation and for Fish, Aquatic Life, and Wildlife purposes.

Part III: Surface Water Assessments and TMDL List

Part III: Surface Water Assessments

Chapter 1 Monitoring Programs

Surface Water Monitoring Programs

Water quality and biological data for Delaware's surface waters are collected under Delaware's Ambient Surface Water Quality Monitoring Program and Biological Monitoring Program within DNREC. Several active citizen monitoring programs have also been developed throughout Delaware that augment the data collected by DNREC. These programs are discussed below.

The DNREC recognizes the need to use its personnel and financial resources efficiently and effectively. To that end, surface water quality monitoring is conducted in a manner that focuses available resources on the Whole Basin Management concept. The Whole Basin Management Program in Delaware operates on a 5-year rotating basis. This new approach enables the DNREC to comprehensively monitor and assess the condition of the State environment with due consideration to all facets of the ecosystem.

Elements of the State's specific Surface Monitoring Program include:

- TMDL-Related Monitoring
- General Assessment Monitoring
- Toxics in Biota Monitoring
- Toxics in Sediment Monitoring
- Biological Assessment Monitoring
- TMDL Related Monitoring

Section 303(d) of the Clean Water Act (CWA), as amended by the Water Quality Act of 1987, requires States to identify those waters within their boundaries that are water quality limited, to prioritize them, and to develop a Total Maximum Daily Load (TMDL) for pollutants of concern. A water quality limited water is a waterbody in which water quality does not meet applicable water quality standards, and/or is not expected to meet applicable standards, even after application of technology-based effluent limitations for Publicly Owned Treatment Works (POTW) and other point sources.

Delaware DNREC has developed a list of water quality limited waters (303(d) List) and is planning to complete TMDLs for all segments on the 1996 list over a ten-year period. The TMDL development schedule is coordinated with the Department's Whole Basin Management Program.

The TMDL related monitoring is designed to provide the necessary information to develop, calibrate, and verify hydrodynamic and water quality models and/or to support the existing models. The Department uses the hydrodynamic and water quality models as management tools for establishing total maximum daily loads; for allocating loads between point and nonpoint sources of pollutants; and for monitoring progress toward achieving water quality goals and standards.

General Assessment Monitoring

The General Assessment Monitoring Network (GAMN) provides for routine water quality monitoring of surface waters throughout Delaware. Each station is monitored for conventional parameters such as nutrients, bacteria, dissolved oxygen, pH, alkalinity, hardness, and metals. The data from this monitoring is entered into the EPA's STORET database, is reviewed and then analyzed in assessing the water quality condition of each water body system. Figure III-1 is a map of active STORET stations used for this report.

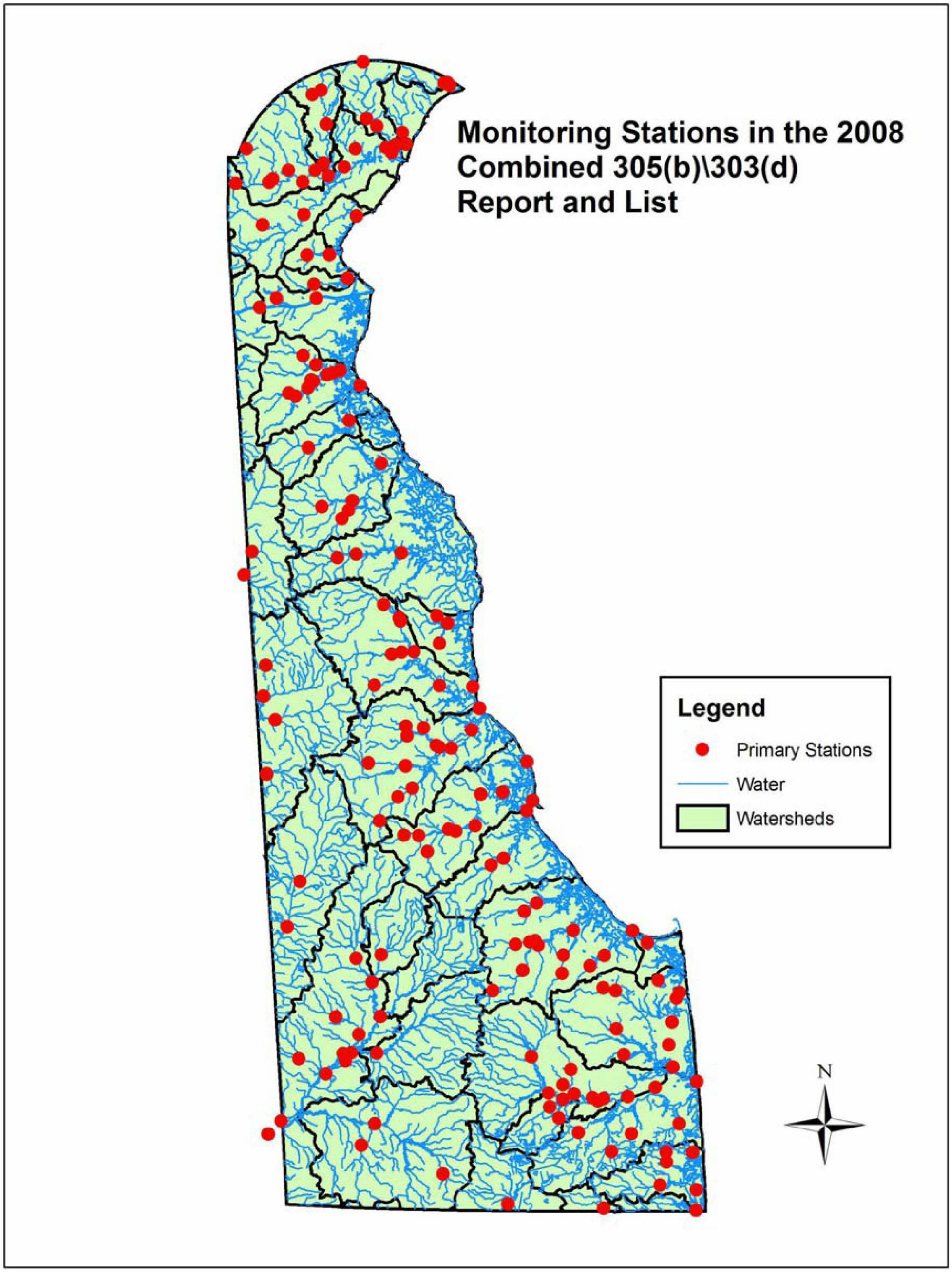
Monitoring Stations in the 2008
Combined 305(b)\303(d)
Report and List
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Figure 3 - 1

Annual Toxics in Biota Monitoring

The Annual Toxics in Biota Monitoring provides for screening level surveys and intensive surveys for toxic contaminants in fish/shellfish. Provision is also made to revisit waters where fish consumption advisories have been issued in the past to determine if contaminant levels in fish are increasing or decreasing over time. Intensive surveys are planned and conducted in areas where contamination has been detected in screening level surveys.

Toxics in Sediment Monitoring

The purpose of the Toxics in Sediment program is to obtain baseline information regarding the levels of various toxics in the sediments of waters throughout the State. The program is designed to complement the Annual Toxics in Biota Monitoring.

Biological Assessment Monitoring

The assessment of the quality of surface waters utilizes a multi disciplinary approach involving physical, chemical, and biological measures. The biological monitoring program is a major tool used by the Department to assess the conditions of surface waters. It includes the assessment of indigenous biological communities and physical habitats of streams, ponds, estuaries and wetlands. The goal of the program is to establish numeric biological criteria in State water quality standards to complement both existing chemical criteria and other assessments focused on fish tissue monitoring and bioassay testing. Standard methods have been developed and tested for assessing the biological community and habitat quality of nontidal streams, and draft numeric criteria are under development. Efforts over the next few years will focus on the development of methods for assessing estuaries and ponds and for assessing the quality and quantity of wetlands

Coordination/Collaboration

Delaware Center for the Inland Bays

The Delaware Center for the Inland Bays was established as a nonprofit organization in 1994 under the Inland Bays Watershed Enhancement Act (Chapter 76 or Del. C. S7603). The mission of the Center for the Inland Bays is to oversee the implementation of the Inland Bays Comprehensive Conservation and Management Plan and to facilitate a long-term approach for the wise use and enhancement of the Inland Bays watershed by conducting public outreach and education, developing and implementing conservation projects, and establishing a long-term process for the preservation of the Inland Bays watershed.

The goals of the Center for the Inland Bays are:

To sponsor and support educational activities, restoration efforts, and land acquisition programs that lead to the present and future preservation and enhancement of the Inland Bays watershed.

To build, maintain, and foster the partnership among the general public; the private sector; and local, state, and federal governments, which is essential for establishing and sustaining policy, programs, and the political will to preserve and restore the resources of the Inland Bays watershed.

To serve as a neutral forum where Inland Bays watershed issues may be analyzed and considered for the purposes of providing responsible officials and the public with a basis for making informed decisions concerning the management of the resources of the Inland Bays watershed.

The establishment of the Center was the culmination of more than 20 years of active public participation and investigation into the decline of the Inland Bays and the remedies for the restoration and preservation of the watershed. A key element of this progression was the publication of a Decisions for Delaware: Sea Grant Looks at the Inland Bays (1983) and the participation by Sea Grant researchers and outreach personnel in the problem-solving process. The last six years of this work were accomplished as part of the National Estuary Program.

The National Estuary Program, established under the Clean Water Act and administered by the U.S. Environmental Protection Agency (EPA), provided approximately $2 million to study the Inland Bays, characterize and set priorities for addressing the environmental problems in the watershed, and develop a Comprehensive Conservation and Management Plan (CCMP) to protect and restore the bays. The underlying theme of the program is that a collaborative, consensus-building effort involving citizens; private interests; organized groups; and federal, state, and local governments is essential to the successful development and implementation of the CCMP. Recently completed through a highly successful participatory effort, the Inland Bays CCMP has now been approved by Governor Thomas Carper and the EPA. Funding is provided by the EPA, the State of Delaware and private donations.

Delaware Nature Society Watershed Stewardship Programs

Watershed Stewardship – comprised of Stream Adoption, Technical Monitoring, and Backyard Habitat – is designed to engage citizens statewide in the protection of Delaware's watersheds.

Stream Adoption

The Stream Adoption program educates individuals, families, scout and school groups about stream ecology, the threats to stream health, and their individual role in protecting water quality. Currently, 61 stream segments are "adopted" in 20 watersheds statewide. The Nature Society celebrated the 20th anniversary of the Stream Watch program through the proclamation of "Delaware Stream Watch Week" by Governor Minner and the sponsorship of legislation designating the stonefly as Delaware's "State Macroinvertebrate". The Nature Society made over 2,100 contacts with school students and scout groups through Stream Watch programs. Volunteers provided 405 hours of service in 2005 through the Stream Adoption program.

Technical Monitoring

Established in 1995, Technical Monitoring is a nationally recognized example of the acceptance and use of citizen science data by the State and the Environmental Protection Agency (EPA). Technical Monitoring was developed to supplement the State's monitoring efforts in other locations by providing reliable baseline values for several different chemical and physical parameters. The monthly sampling frequency, strategic site selection, rigorous quality assurance and control measures, and technical equipment allow for more subtle trend analysis.

Technical monitoring data is collected at 41 sites in the Christina River Basin, which includes the Brandywine, Red Clay, and White Clay Creeks, all in northern New Castle County. There are 5 sites monitored on the Mispillion River in Kent & Sussex counties. The Christina

Basin Technical Monitoring data is being incorporated into a non-point source pollution water quality model used by DNREC's Division of Water Resources and the US Geological Survey for the Delaware – Pennsylvania Total Maximum Daily Load (TMDL) effort for the Upper Christina Watershed. Data collected in the Mispillion Watershed is providing supplementary data to the Division of Water Resources for use in developing the 2005 Mispillion TMDL. In 2005, Technical Monitoring volunteers logged 666 hours.

In addition, the data in both watersheds is published every five years in the Nature Society's State of the Watershed reports. Data collected in the Christina Basin Watershed from 1995-2000 is available online at www.delawarenaturesociety.org.

Backyard Habitat

Backyard Habitat, launched in September 2001, provides official certification for properties or residences that provide food, cover, water, and places for wildlife to raise their young. By adopting practices beneficial to wildlife such as landscaping with native plants and limiting use of pesticides, participants help to improve local water quality by reducing their reliance on products that contribute to non-point source pollution. The Nature Society offers homeowners interested in Backyard Habitat certification free, one-on-one technical assistance through our trained Habitat Stewards volunteer corps. In 2005, the Nature Society has certified 79 properties (186 total to date) representing 93 acres in a variety of development types ranging from urban to suburban reserve across all three Delaware counties.

Citizens Monitoring Programs in Delaware

In recent years, many citizens' groups have been formed nationwide in response to the growing concerns about degraded water quality. Delaware was one of the first states to initiate citizens' water quality monitoring program of streams to augment fixed monitoring by state agencies. The involvement of citizens in collecting data and making observations on their streams results in an educated public with an appreciation for their watersheds and awareness of pollution threats to vital resources. Data and observations collected by citizens with a strong sense of environmental stewardship will contribute to the long-term success of environmental strategies.

Delaware has four programs that use citizens to monitor water quality. The Delaware Nature Society in cooperation with DNREC established Delaware Stream Watch in 1985. The Inland Bays Citizen Monitoring program was established in 1990 as part of the Inland Bays Estuary Program. Concerned citizens of the City of Seaford in cooperation with DNREC founded the Nanticoke Citizen Monitoring Program in 1991. The Adopt A Wetland Program initiated in May 1993 by the Division of Water Resources and later transferred to the division of Fish and Wildlife.

Inland Bays Citizen Monitoring Program

The Inland Bays Citizen Monitoring Program is managed by the University of Delaware Sea Grant Marine Advisory Service (SGMAS) through an MOU with DNREC, Division of Water Resources. The progam was established in 1991. The goals of the Inland Bays Citizen Monitoring Program are: 1) to collect verifiable water quality data to be used to support public policy decisions with regard to the management of the Inland Bays and 2) to increase public awareness and support for the protection and management of these aquatic resources through public participation.

About 30 citizen monitors make observations at 25 sites encompassing the Inland Bays watershed, evaluating dissolved oxygen, surface water and air temperature, salinity, secchi depth and water depth. Additional site observations include weather, tides and the abundance of macroalgae in near-shore waters. Volunteers collect samples on a weekly basis from mid-April to mid-October, and every two weeks otherwise, if weather permits. Rainfall data are collected daily at three designated locations in the watershed. Volunteers complete data collection sheets and send them to SGMAS for data entry. Volunteer data are reviewed for errors and entered by the field coordinator into a Microsoft Excel spreadsheet on a microcomputer.

Twice a month, volunteers collect water samples from 17 sites that are transferred to College of Marine Studies (CMS) laboratories for analysis of dissolved inorganic nitrogen (nitrate, nitrite and ammonium), dissolved inorganic phosphorous (orthophosphate), chlorophyll a, and total suspended solids using standard laboratory methods. Six times from April through October, volunteers collect water samples from six sites that are transferred to the DNREC Shellfish Program for analysis of fecal coliform bacteria.

The sampling methodology used in this program has been approved by the U.S. Environmental Protection Agency and has been published under the title Quality Assurance Project Plan for the Inland Bays Citizen Monitoring Project. Quality Assurance is maintained by holding group Quality Assurance/Quality Control (QA/QC) sessions at six month intervals. Sessions are conducted as needed for individual volunteers.

The Citizen Monitoring Program has been successful at forging partnerships with data users, most notably State and local governments. The data is an integrated component of the Inland Bays Monitoring Plan. Citizen data has 1) supported the siting of submerged aquatic vegetation test plots, and 2) has been utilized in the Hydrodynamic and Water Quality model used to calculate Total Maximum Daily Loads (TMDL), or to predict tidal flushing from a proposed artificial inlet. Volunteers have participated in several cooperative mini-projects in which the data they collected was used to support research conclusions made by DNREC and CMS scientists. Citizen concern about pathogens in the water and adverse health effects prompted the addition of fecal coliform testing in 1992. The data has been used to support the opening of shellfish beds in the Inland Bays. Citizen monitors have also been involved in monitoring the growth and survival of clams and oysters to support the development of a shellfish management plan. Community concern about water quality in the canal systems of South Bethany prompted the town council to initiate a community-based study in 1995 to support the development of a stormwater management plan.

Project benefits include 1) improved understanding of water quality dynamics, 2) sense of "ownership" of the study by the community and interest in improving water quality through better management practices, 3) cooperation among resource agencies and community leading to trust and ongoing relationships.

The Sea Grant Program Manager provides oversight and coordination of the Program. A field coordinator is employed on a one-half time basis. The management team is responsible for data management and analysis, public education, quality assurance, volunteer recruitment, management and training of volunteers, daily operations of the project, conducting training sessions and field workshops, writing summary reports, and writing grant proposals to support additional mini-projects. Funding for the project is through a line-item in the DNREC budget. CMS provides office, laboratory and classroom space, laboratory equipment and technical support. DNREC provides technical advisors for program initiatives, and assistance with training and field sessions. The annual budget is approximately $37,000.

Data Interpretation and Communication

Delaware has converted its older Waterbody System (WBS) database to the new EPA provided Assessment Database (ADB). The ADB is a Microsoft Access© database that generated the summary Use Assessment tables in this report. The ADB was updated in 2007 to a newer version. During the conversion process, it was determined that nutrient impairments had not been accounted for within the database. Accounting for the impairments changed the percent of waters that were supporting their uses. This was not an increase in actual impairments; rather it was a correction to the database.

Chapter 2: Assessment Methodologies and Summary Data

2008 Assessment, Listing and Reporting Methodologies Pursuant to Sections 303(d) and 305(b) of the Clean Water Act

General Provisions

All readily available data and information for the period of September 1, 2002 through August 31, 2007 will be considered for the assessment of most designated uses. For waters of Exceptional Recreational or Ecological Significance (ERES), data from calendar years 1995-2006 will be assessed for trends. Given that adequate water quality data may not be available in all cases, determinations of use attainment will be made with an abundance of caution.

Data Quality and Quantity

Data from the Department of Natural Resources and Environmental Control's (DNREC's) Environmental Laboratory Section (ELS) will be considered for use if it is collected and analyzed in accordance with the DNREC ELS Quality Assurance Project Plan. For data from sources other than the DNREC ELS, the Department will consider the quality controls used in collection and analysis to determine if it will be appropriate for use in this assessment. Data will be considered readily available if it is in an electronic format that can be imported into or exported from a modern spreadsheet or database program like Microsoft Excel, Access or Quattro Pro. Data that is only available on paper will be considered on a case by case basis given the limited resources available to the Department to convert such data to the more usable electronic format.

The Department routinely collects water quality samples at about180 stations throughout the State. That data makes up the bulk of the data available for use in 305(b) assessments. The Department considers data from the most recent five-year period, thus, at each station, there are usually data from 20 sampling dates or more. Some stations are in place for a more limited time period and have smaller data sets. Other readily available data and reports are requested in advance of each assessment from parties outside of the Department and used when they are made available. In addition to electronic mail requests from specific organizations, a notice will be published in the Delaware State News and the News Journal.

For the 2008 assessment, the Department will consider data and information received on or before December 15, 2007 from the following sources:

- Reports prepared to satisfy Clean Water Act (CWA) Sections 305(b), 303(d) and 314 and any updates;
- The most recent Section 319(a) nonpoint source assessment;
- Reports of ambient water quality data including State ambient water quality monitoring programs, citizen volunteer monitoring programs, complaint investigations, and other readily available data sources (e.g., EPA's Storage and Retreival System (STORET), the United States Geological Survey, and research reports), and data and information provided by the public;
- Reports relative to dilution calculations or predictive models;

- Water quality management plans;
- Superfund Records of Decision; and
- Safe Drinking Water Act source water assessments.
- Fish and shellfish advisories
- Restrictions on water sports or recreational contact

Coordination with Delaware River Basin Commission (DRBC) and Chesapeake Bay Program Assessments

The DRBC prepares 305(b) assessment reports every two years for the Delaware River and Delaware Bay. Delaware will incorporate the most recent use attainment determinations made by DRBC for the shared waters of the Delaware River and Delaware Bay into its 2008 303(d) list. Delaware expects to work cooperatively with the DRBC, member states and stakeholders to develop and implement TMDLs in waters of the Delaware River and Bay that the DRBC determines to be impaired.

The Chesapeake Bay Program (CBP) is doing assessments for waters in the Chesapeake Bay and nearby waters that drain into the bay in co-operation with Maryland, Virginia, Washington D.C. and Delaware. Delaware will incorporate the most recent use attainment determinations for waters of the state that use criteria developed by the CBP for waters that drain to the Chesapeake Bay.

Use of Environmental Protection Agency Integrated Assessment Guidance

On July 29, 2005, the EPA published "Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act." The guidance is available on the internet at this URL: http://www.epa.gov/owow/tmdl/2006IRG/index.html. The Guidance was reaffirmed in the October 12, 2006 for the 2008 listing process in a memo by Diane Regas of the EPA. That memo is online at this URL: http://www.epa.gov/owow/tmdl/2008_ir_memorandum.html . The core recommendation of the guidance is to categorize all waters of the state according to the following five categories:

Category 1: All designated uses are met;

Category 2: Some of the designated uses are met but there is insufficient data to determine if remaining designated uses are met;

Category 3: Insufficient data to determine whether any designated uses are met. Either no data is available or some data is available, but it is insufficient to make a determination

Category 4: Water is impaired or threatened but a TMDL is not needed;

- 4A: All TMDLs for this segment have been completed and EPA approved. Class 4A waters have all necessary TMDLs approved, but one or more impairments exist, despite the approved TMDLs.

- 4B: Other required control measures are expected to result in the attainment of WQSs in a reasonable period of time
- 4C: The impairment or threat is not caused by a pollutant

Category 5: Water is impaired or threatened and a TMDL is needed for at least one pollutant or stressor

Each of Delaware's waterbody segments will be assigned to the appropriate category for each designated use and then 'rolled up' into a final categorization for the segment. For the final categorization, the highest category number from the applicable use determinations will be assigned to each segment. For example, if a hypothetical segment has a Category 1 determination for aquatic life use support based on average dissolved oxygen, a Category 3 determination for primary contact use, and a Category 5 determination for aquatic life use support based on the dissolved oxygen minimum criteria, then the segment would be given an overall categorization of category 5. In this case, DNREC would pursue the collection of additional enterococcus data in order to assess the primary contact use and establish a schedule for developing a TMDL in order to meet the minimum dissolved oxygen criteria.

Dissolved Oxygen (DO) Aquatic Life Use Support (ALUS)

The following types of DO data are potentially available for analysis:

- Field measurements taken by personnel using handheld DO probes; and
- Continuous monitoring data collected using multiparameter monitoring systems that are typically deployed for several days, weeks, or months. In order to get a more accurate picture of dissolved oxygen dynamics and other water quality parameters, the Department continues to increase its use of continuous monitoring systems.

To determine ALUS with regard to Dissolved Oxygen (DO), the following methodology will be used to compare measured DO concentrations to two different standards, the minimum at all times and daily average concentrations. Average DO concentrations are considered to be met if the 10^{th} percentile of available data is above the applicable criteria of 5.0 mg/l for marine waters and 5.5 mg/l for fresh waters. The statewide minimum DO concentration for surface waters is 4.0 mg/l at any time. Stations are judged to be in compliance with this criterion if the minimum is not violated by more than 1% of continuous monitoring data and no more than two field samples are below the minimum.

Assessment of Average DO Criteria Attainment:

If sampling events occurred on at least ten different days during the period September 1, 2002 through August 31, 2007 for each station, attainment of the DO average criteria will be assessed using the method that follows. Stations with fewer than ten different sampling days will be considered to have insufficient data and be placed in Category 3 for this parameter for this assessment cycle.

For purposes of DO compliance with the daily average criteria in a segment, continuous monitoring data, if available, will be averaged on a daily basis for each station. If no continuous data is available, then the field measurements (as available) will be considered to be representative of the daily average for that day. Any type of sample (continuous or field measurement) will be considered to be representative for that station at the time of collection. Once the daily average for each station (station daily average, SDA) has been determined, the SDAs for each station will be pooled and the upper confidence limit (UCL) of the nonparametric 10^{th} percentile confidence interval will be determined using methods described in Section 3.7 of Helsel and Hirsch . That UCL will be compared to the applicable standard. If the UCL is above the applicable average criteria for all stations in a segment, the segment will be considered to be fully supporting (Category 1) for the DO average portion of ALUS. If the UCL from any station in a segment is below the applicable average, the segment will be considered not fully supportive of the aquatic life use (Category 5)

Formally stated, the following hypotheses will be tested:

H_0: at the 90% Confidence level, $X_{10} \geq$ Standard

H_1: at the 90% Confidence level, $X_{10} <$ Standard

Where X_{10}= Non parametric estimate of the 10th percentile of available data.

Assessment of Minimum DO Criteria Attainment:

Attainment of the minimum DO criteria will be assessed based on all available data (note that ten samples in 5 years are not needed for the comparison to the minimum). For stations for which no continuous DO monitoring data are available, two or more SDAs in five years below the applicable minimum will be sufficient evidence to show that the aquatic life use is not supported (Category 5).

For stations with continuous monitoring data, available continuous monitoring data will be pooled on an annual basis for each station. The UCL of the first percentile of the data will be calculated and compared to the minimum criteria in the same manner as the average comparison above for each year of the applicable five previous years. One or more years in which the upper confidence limit of the first percentile is below the minimum will be sufficient to determine that aquatic life use is not fully supported in the segment (Category 5). See the flow chart below for a graphical depiction of the dissolved oxygen assessment process.

Nutrient Enrichment Assessment

From a state-wide perspective, nutrient overenrichment is one of the leading causes of water quality impairment in Delaware. While nutrients are essential to the health of aquatic ecosystems, excessive nutrient loadings to surface waters can lead to an undesirable proliferation of aquatic weeds and algae, which in turn can result in oxygen depletion and associated impacts to fish and macroinvertebrate populations. Excessive aquatic plant growth can also preclude or seriously curtail water dependent activities such as fishing and boating when plant densities become so great that uses are not physically possible.

For tidal portions of the Indian River, Rehoboth Bay and Little Assawoman Bay watersheds, the water quality criterion for dissolved inorganic nitrogen is a seasonal average of 0.14 mg/l as N, and for dissolved inorganic phosphorus a seasonal average of 0.01 mg/l. For those stations where sampling events occurred on at least ten different days during the period September 1, 2002 through August 31, 2007, the lower confidence limit (LCL) of the nonparametric estimate of the 90^{th} percentile of the available data for each station will be compared to the above values to assess attainment of desired nutrient levels in these waters. Stations with fewer than ten different sampling days will be considered to have insufficient data and be placed in Category 3 for this assessment cycle. Segments with one or more stations whose LCL is above the criteria will be considered to be not fully supporting the aquatic life use (Category 5).

For the remaining waters of the State, the Department has been using total nitrogen and total phosphorus levels listed in the chart below to make ALUS decisions. These target values were developed in order to implement the narrative provisions in the Surface Water Quality Standards. For those stations with sampling events on at least ten different days during the five-year assessment period, the LCL of the nonparametric estimate of the ninetieth percentile of the available data for each station will be compared to the moderate values shown in the table below. Stations with fewer than ten different sampling days will be considered to have insufficient data and be placed in Category 3 for this assessment parameter for this assessment cycle. Segments with one or more stations whose LCL is at or above the "moderate" values listed below will be considered to be not fully supporting the aquatic life use (Category 5).

Formally stated, the following hypotheses will be tested:

H_0: at the 90% Confidence level, $X_{90} \leq$ Minimum Moderate Value

H_1: at the 90% Confidence level, $X_{90} >$ Minimum Moderate Value

Where X_{90}= Non parametric estimate of the 90th percentile of available data

Categories of Nutrient Concentrations

Nutrient Range	Total Nitrogen (mg/l)	Total Phosphorus (mg/l)
Low	< 1.0	< 0.1
Moderate	1.0 - 3.0	0.1 - 0.20
High	> 3.0	> 0.20

The following conditions will also result in segments being listed in Category 5:

1. There were documented cases of nuisance algal blooms or excessive macrophyte growth. These cases violate Section 4.1.1.3 of Delaware's Standards which require waters of the State to be free from substances that may result in a dominance of nuisance species;

2. Detailed, site-specific monitoring studies indicated a strong linkage between nutrient levels and indicators of eutrophication such as high chlorophyll-a concentrations, extreme daily variation in dissolved oxygen levels, and high sediment oxygen demand; or

3. For ERES waters, a long-term trend analysis indicates a statistically significant increase in nutrient levels over time. Such increases are inconsistent with the short-term goal of "holding the line" on water quality in ERES waters. Such increases are also inconsistent with the long-term goal of restoring those waters, to the extent feasible, to their natural state.

Assessment of Aquatic Life Use Support Using Site-Specific Data That Results from Environmental Assessments and Other Programs

In the normal course of business, the Department requests, receives and evaluates water quality data for various environmental programs. Similar data may also come from other parties (e.g., State, Federal, or local agencies). The Department will use those site-specific studies to compare water quality data to the applicable water quality standard(s) and make assessment and listing decisions for the affected segments. If the data show no water quality criteria are exceeded and no uses are impaired, no further listing action will be taken. If the data are ambiguous or inconclusive, the segment will be listed in Category 3. If water quality criteria are exceeded or uses are impaired as a result of a contaminated site, and the owners of the site are making substantial progress (as determined by the Department) toward correcting the pollution problem, the segment will be listed in Category 4. If it appears that there is a water quality problem related to a contaminated site, and that substantial progress is not likely in the near future, the segment will be listed in Category 5.

Assessment of Waters of Exceptional Recreational or Ecological Significance

ERES is a special use designation in Delaware's Surface Water Quality Standards that applies to waters deemed to be of Exceptional Recreational or Ecological Significance. The short-term goal for ERES waters is to "hold the line" on pollution and the long-term goal is to restore ERES waters, to the maximum extent practicable, to their natural condition.

The ERES designated use will be assessed using data from the period January 1, 1995 through August 31, 2007 for total nitrogen and total phosphorous concentrations to assess trends for those parameters. Seasonality for each parameter at each station will be determined using the Kruskal-Wallis test at the 5% significance level. Parameters showing no seasonality will be assessed using Sen's slope estimator with an Alpha of .05. Parameters showing seasonality will be evaluated using seasonal Kendall slope estimations at the 95% confidence level. Segments with one or more stations that show statistically significant increases in total nitrogen or total phosphorus levels will be considered to not be in attainment of the ERES designated use.

Primary Contact Recreation Use Assessments

Generally, total enterococcus bacteria water quality samples are collected several times each year at each monitoring station. In addition, for all guarded beaches and many unguarded beaches, samples are collected much more frequently from mid-May through mid-September as part of beach monitoring activities. Assessment of the above two situations for primary contact recreation use support will be as follows.

For segments with no beach monitoring, if sampling events occurred on at least ten different days during the five-year assessment period, the geometric mean of the available enterococcus (colonies/100 ml)data for each station will be compared to the geometric mean values shown in the table below. Stations with fewer than ten different sampling days will be considered to have insufficient data (Category 3) to make a determination if the geometric mean criterion is met. Segments with one or more station geometric means above the values in the table will be considered to not be in support of the Primary Contact Recreation designated use (Category 5).

Water Type	Geometric Mean (Enterococcus colonies/100 ml) Criteria for Primary Contact Use
Fresh	100
Marine	35

Segments with beaches that are closed as a result of poor bacterial water quality data two or more times in a single calendar year will be considered not to support the primary contact designated use (Category 5). Some beaches are routinely closed after rain events without using water quality data to make the decision. These rainfall-based management plans are developed by statistically analyzing the relationship between rainfall amounts and Enterococcus levels. Regression analyses are used to determine the amount of rainfall that will cause exceedances of criteria. However, since the existing management plans are based upon outdated criteria, rainfall-based closures will not be considered for making designated use support decisions.

Listing Criteria for Waters with Fish Consumption Advisories

For purposes of developing Delaware's Integrated 305(b) Report and 303(d) List, the issuance of a "no consumption" or "limited consumption" fish advisory will be interpreted as a violation of Section 4.6.3.2.3 and Section 4.1.1.3 of Delaware's Surface Water Quality Standards. Those two narrative provisions provide, respectively, that 1) waters of the State shall be maintained to prevent adverse toxic effects on human health resulting from ingestion of chemically contaminated aquatic organisms; and 2) waters of the State shall be free from pollutants that may endanger public health. Any segment for which fish consumption advisories are in place as of December 2005 will be placed in Category 5 for each of the chemicals of concern included in each advisory. In the event that fish consumption advisories have been lifted, or any chemical of concern has been removed from an advisory, any requirements to develop a TMDL for that chemical in that segment will be removed if the fish tissue data was originally the sole cause for placement of the segment on the 303(d) list.

Ammonia assessments

In fresh waters, ammonia's toxicity is known to be controlled by both the temperature and pH of the water. EPA recommended criteria are based on the presence or absence of early life stages of fish and specify that the criterion should not be exceeded more than one time in a three-year period. The applicable criterion is calculated for each sampling event.

For stations whose average salinity during the assessment period is below 5 ppt, total ammonia as nitrogen, temperature and pH data will be used to compare the total ammonia data to the criterion calculated according to the following formulas:

When fish early life stages are present:

$$\text{Criterion} = \frac{0.0577}{1 + 10^{7.688-\text{pH}}} + \frac{2.487}{1 + 10^{\text{pH}-7.688}} * \text{MIN}\left(2.85,\ 1.45 * 10^{0.028*(25-T)}\right)$$

When fish early life stages are absent:

$$\text{Criterion} = \frac{0.0577}{1 + 10^{7.688-\text{pH}}} + \frac{2.487}{1 + 10^{\text{pH}-7.688}} * \left[1.45\ 10^{0.028*(25-\text{MAX}(T,7))}\right]$$

If two or more sampling events from the same station result in exceedances of the calculated criteria, the station will be deemed not supported for aquatic life use support based on ammonia toxicity.

Temperature Assessments

Delaware surface water quality criteria indicate that, in freshwaters, no human induced increase of the daily maximum temperature above 86°F (30.0 °C) shall be allowed and in marine waters the maximum human induced temperature is 87 °F (30.6 °C). Stations for which two or more sampling events are above the criteria and whose segments receive thermal discharges will be deemed not in support of the aquatic life use.

Assessment of Harvestable Shellfish Waters Use Support

Delaware is a member of the Interstate Shellfish Sanitation Conference (ISSC), the administrative body of the National Shellfish Sanitation Program (NSSP). Delaware's Shellfish Sanitation Regulations are administered as per ISSC / NSSP standards and practices. Section 3.2.1.3 of said Regulations specifies data collection / closure criteria for Delaware shellfish waters, which include parameters constituting administrative closure of shellfish waters. Parameters that would trigger administrative closures in compliance with ISSC/NSSP standards may include theoretical pollution loading, sanitary shoreline survey information, and numerical total coliform data. No Delaware waters are closed to shellfish harvesting as a result of actual total fecal coliform data. All Delaware shellfish waters designated as other-than-Approved, which may include Prohibited, Seasonally Approved, Conditionally Approved, or restricted, are so designated on the basis of administrative decisions. Specifically, these criteria include: 1) theoretical pollution loading, which is determined to be the potential for intermittent pollution discharges, making detection of said theoretical releases non-detectable via conventional sampling methodology; 2) sanitary shoreline survey findings which indicate potential for theoretical pollution loading, also non-detectable via conventional sampling methodology; and 3) may include dilution of theoretical virus discharges from point sources; however, not corresponding to increases in total coliform levels. In order to comply with ISSC / NSSP requirements, Delaware samples all shellfish waters not administratively closed for other reasons for fecal coliform bacteria. Delaware's Shellfish Program is assessed under the auspices of the U.S. Food and Drug Administration, as per ISSC/NSSP standards and practices, and submits bacteriological water quality data to the U.S. Food and Drug Administration to demonstrate compliance.

To assess the harvestable shellfish designated use, the Department will consider the data and reports to FDA for waters that are not administratively closed. Waters that have been administratively closed for shellfish harvesting as a result of fecal coliform exceedances during the assessment period will be assessed as category-5.

Setting Priorities for Water Quality Limited Segments Still Needing TMDLs

Because there are more water quality issues and impacts than there are public and private resources to address those impacts, it is necessary to set priorities for water quality limited segments. This is true for Delaware as well as the country as a whole. With this in mind, and recognizing the need to provide a logical, deliberate, and reasonable path forward, it becomes necessary to organize and order the work at hand into different priorities based upon a number of factors.

The timetable for developing TMDLs for newly listed waters in Delaware are based on the Department's Whole Basin Management Program rotating basin schedule shown below.

Basin	Year for TMDL Development

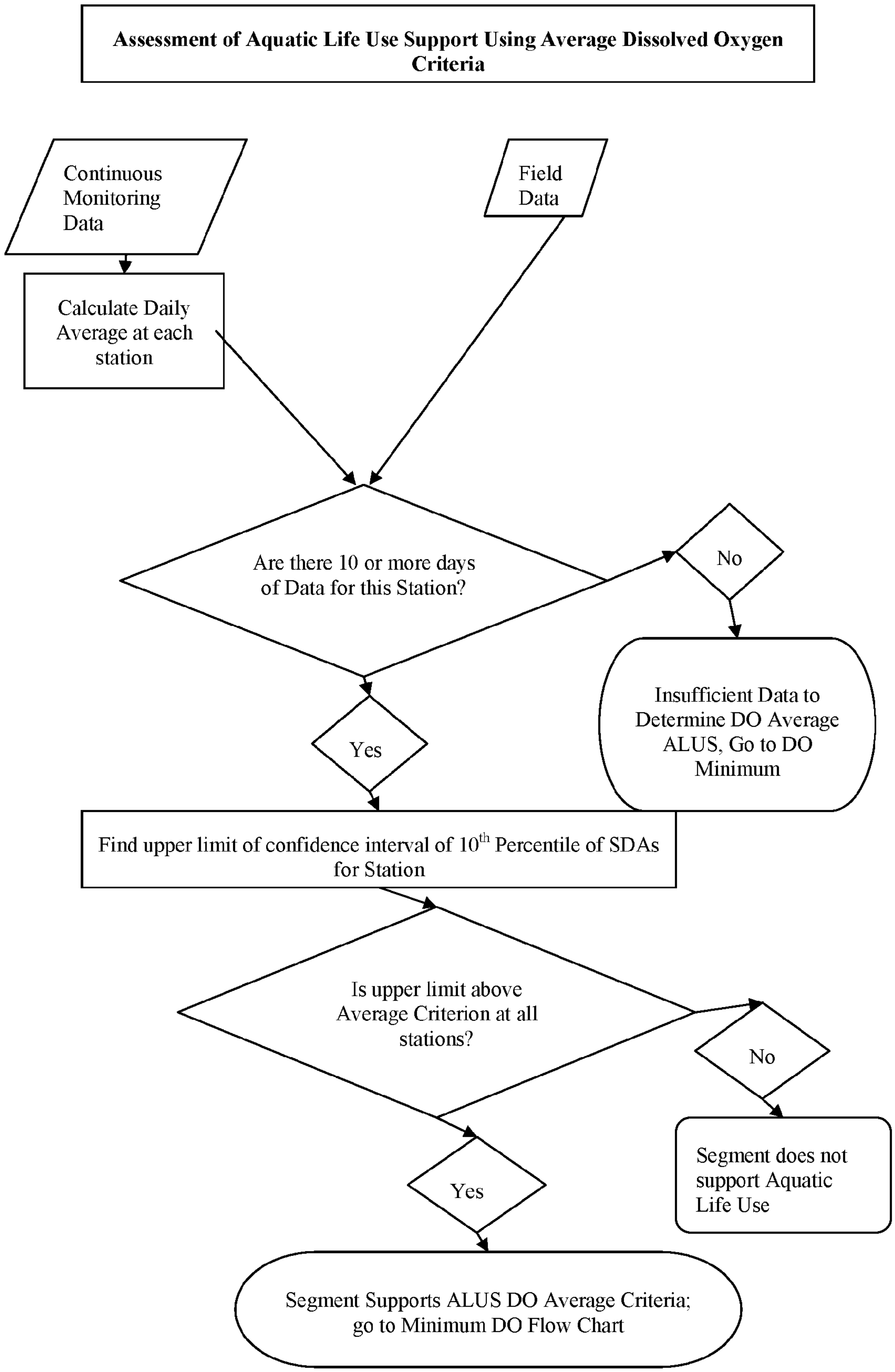
Piedmont	2009
Chesapeake Bay	2010
Delaware Bay	2012
Delaware Estuary	2013
Inland Bays/Atlantic Ocean	2011

Rationale Used to Designate a Lower Category for Segments Previously Designated for TMDL Development

The Department may move segments from prior 303(d) Lists (equivalent to Category 5) to another category based on any of the following factors, and will document the reasons for doing so on a case-by-case basis.

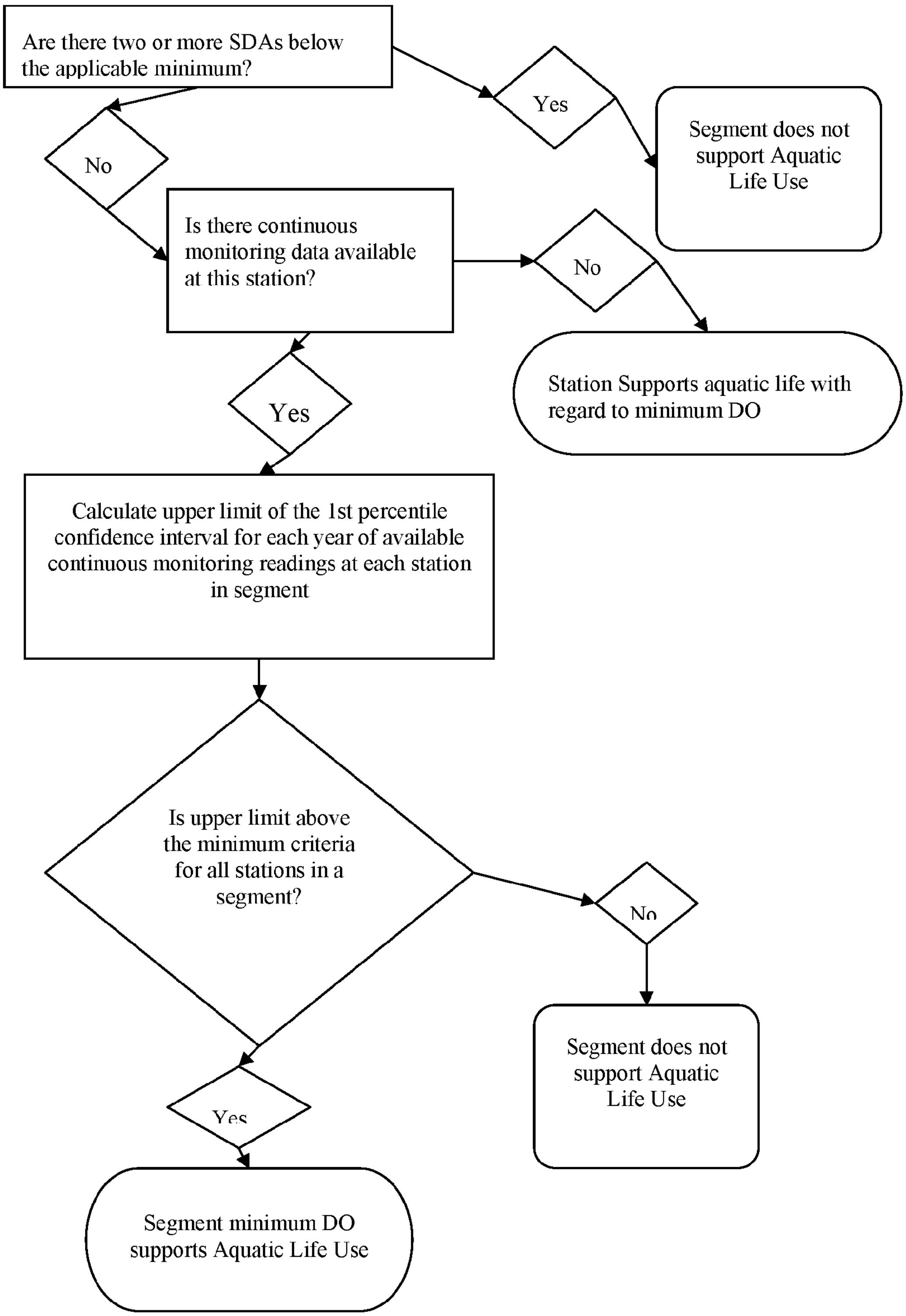
- The assessment and interpretation of more recent or more accurate data demonstrate that the applicable WQS(s) is being met. (Move to category 1)
- The results of more sophisticated water quality modeling demonstrate that the applicable WQS(s) is being met. (Move to category 1)
- Demonstration that flaws in the original analysis of data and information led to the water being incorrectly listed. (Move to category 1)
- The development of a new listing methodology, consistent with State WQSs and federal listing requirements, and a reassessment of the data that led to the prior listing, concluding that WQSs are now attained. (Move to category 1)
- A demonstration pursuant to 40 CFR 130.7(b)(1)(ii) that there are effluent limitations required by State or local authorities that are more stringent than technology-based effluent limitations required by the CWA and that these more stringent effluent limitations will result in the attainment of WQSs for the pollutant causing the impairment. (Move to category 4A or 4B until data and analysis support move to Category 1)
- A demonstration pursuant to 40 CFR 130.7(b)(1)(iii) that there are other pollution control requirements required by State, local, or federal authority that will result in attainment of WQSs for a specific pollutant(s) within a reasonable time. (Move to category 4A or 4B until data and analysis support move to Category 1)
- Documentation that the State included on a previous Section 303(d) List an impaired water that was not required to be listed by EPA regulations; e.g., waters where there is no pollutant associated with the impairment. (Move to category 1 or 4C as appropriate)
- Approval or establishment by EPA of a TMDL since the last Section 303(d) List. (Move to category 4A or 4B until data and analysis support move to Category 1)

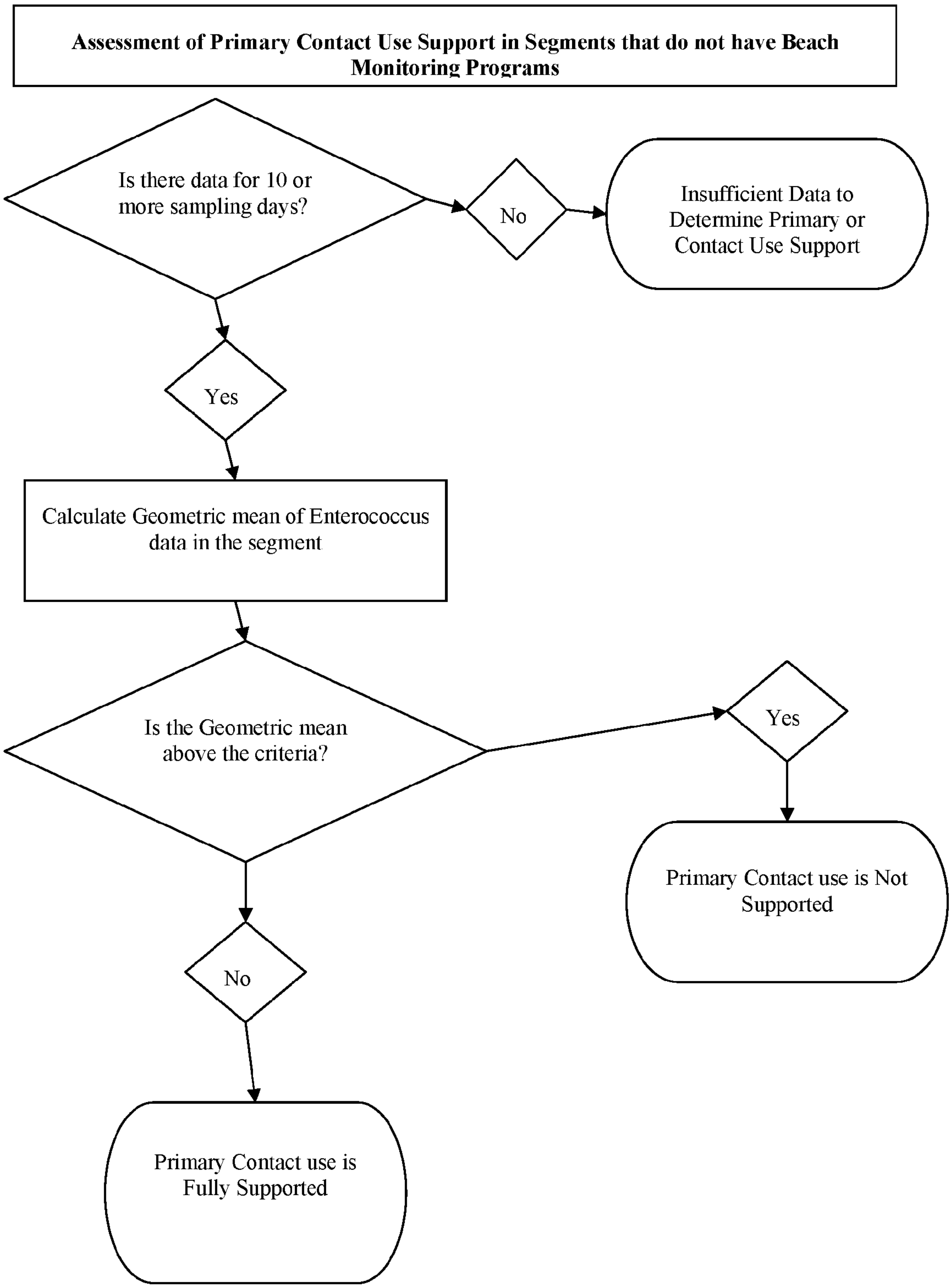
Flow Charts for Designated Use Attainment



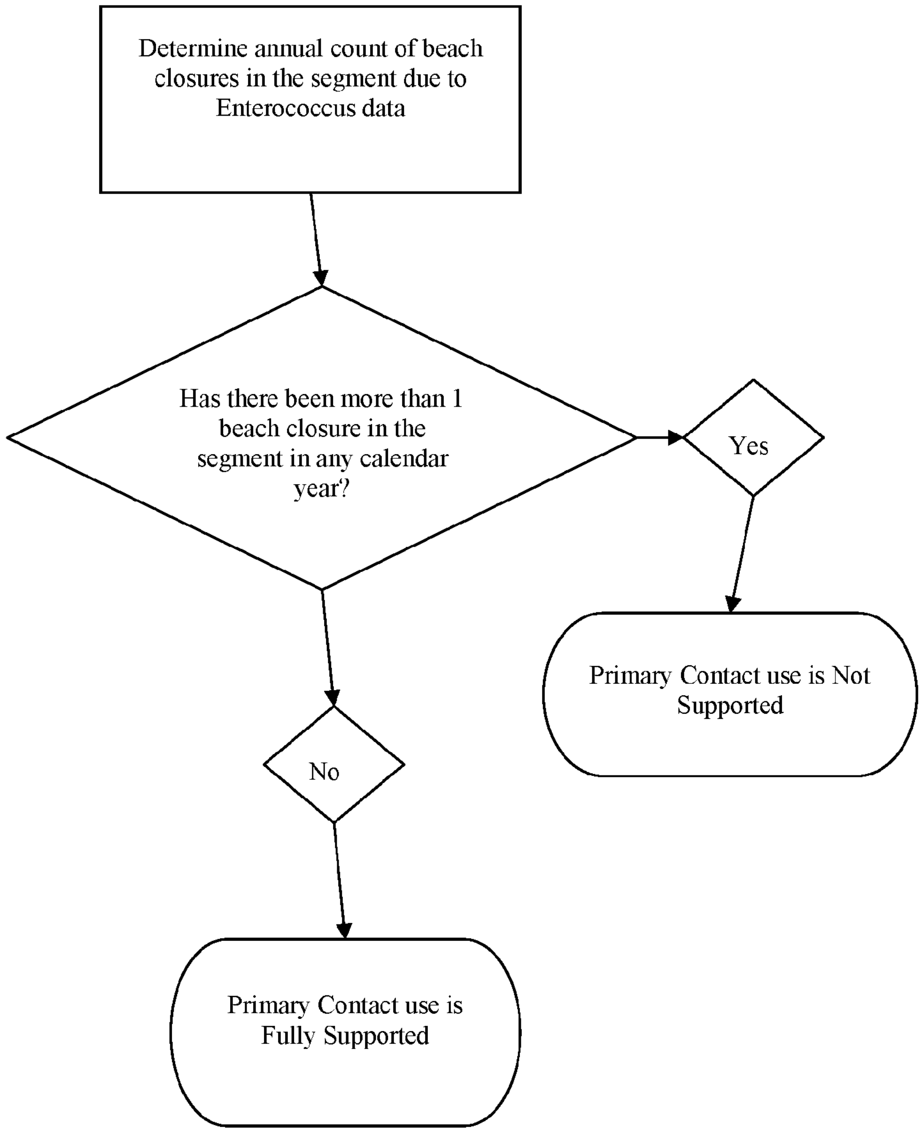
Assessment of Aquatic Life Use Support Using Average Dissolved Oxygen Criteria
Continuous Monitoring Data
Field Data
Calculate Daily Average at each station
Are there 10 or more days of Data for this Station?
No
Insufficient Data to Determine DO Average ALUS, Go to DO Minimum
Yes
Find upper limit of confidence interval of 10th Percentile of SDAs for Station
Is upper limit above Average Criterion at all stations?
No
Segment does not support Aquatic Life Use
Yes
Segment Supports ALUS DO Average Criteria; go to Minimum DO Flow Chart

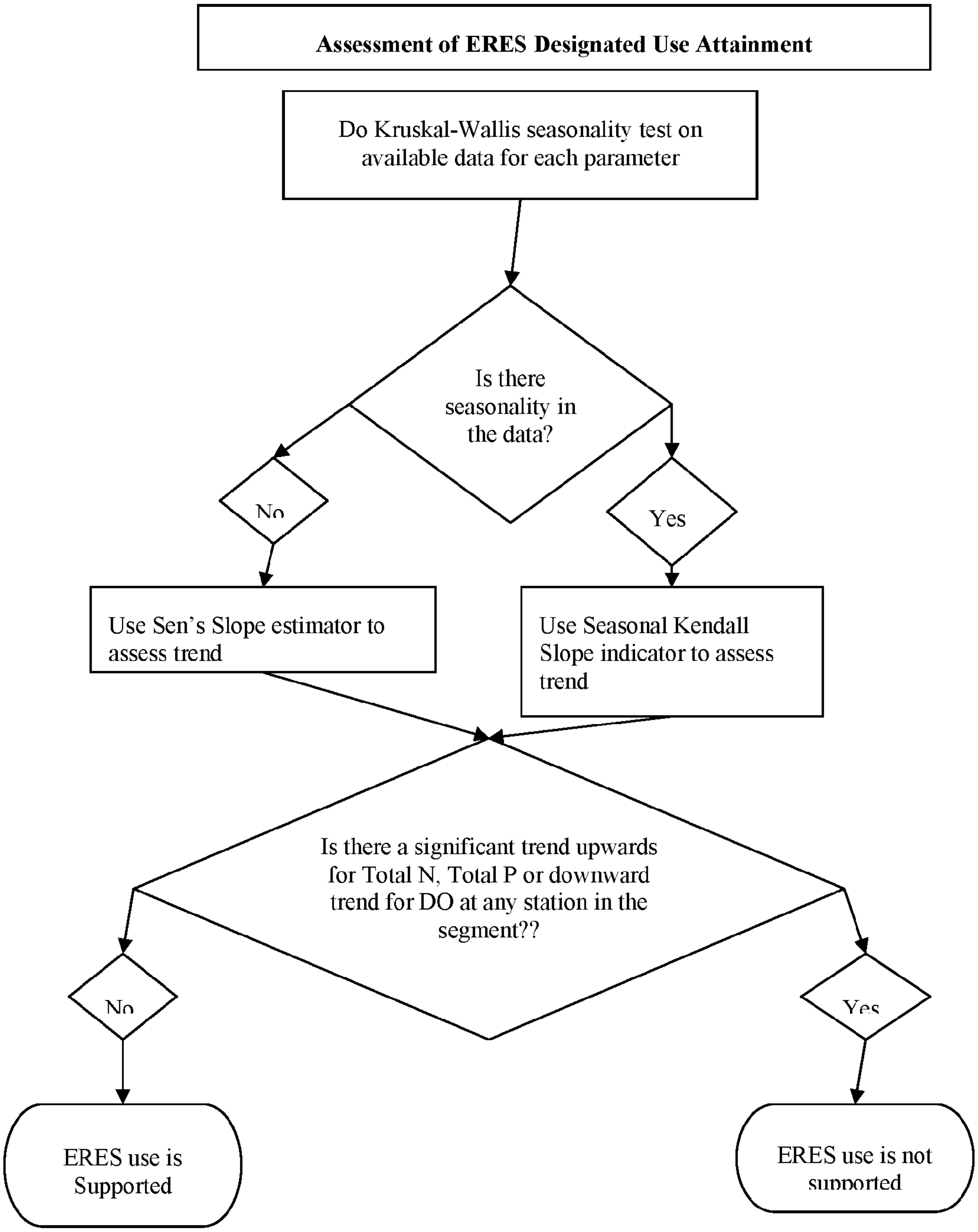
Assessment of Aquatic Life Use Support Using Minimum Dissolved Oxygen Criteria




Assessment of Primary Contact Use Support in Segments that do not have Beach Monitoring Programs
Is there data for 10 or more sampling days?
No
Insufficient Data to Determine Primary or Contact Use Support
Yes
Calculate Geometric mean of Enterococcus data in the segment
Is the Geometric mean above the criteria?
Yes
Primary Contact use is Not Supported
No
Primary Contact use is Fully Supported

Assessment of Primary Contact Use Support in Segments with Beach Monitoring Programs




Assessment of ERES Designated Use Attainment
Do Kruskal-Wallis seasonality test on available data for each parameter
Is there seasonality in the data?
No
Yes
Use Sen's Slope estimator to assess trend
Use Seasonal Kendall Slope indicator to assess trend
Is there a significant trend upwards for Total N, Total P or downward trend for DO at any station in the segment??
No
Yes
ERES use is Supported
ERES use is not supported

References:

Helsel D.R. and R.M. Hirsch, 2002, Statistical Methods in Water Resources

Publication available at: http://water.usgs.gov/pubs/twri/twri4a3/

Conover, W.J., 1980, Practical Nonparametric Statistics, 2 ed., John Wiley and Sons

Chapter 3: Rivers/Streams, Estuaries and Lakes Water Quality Assessments and List of Waters needing TMDLs

Presented on the following pages are seven tables and summaries of use support for Harvestable Shellfish waters, ammonia toxicity assessments and continuous dissolved oxygen findings. Table III-1 is a summary of data collected by the Department in the period from September 1, 2002 through August 31, 2007, by station. For each monitoring station, the segment number, segment description and location are shown with the summary statistics. Table III-2 rolls up the stations into their segments and shows the current use attainment for each segment . Tables III-3, III-4, III-5 and III-6 are use support roll ups based on use of EPA's Assessment Data Base. Table III-7 is the Final Determination for the State of Delaware Clean Water Act Section 303(d) List of Waters Needing TMDLs. Table III-7 integrates current and past assessments into a list of waters needing TMDLs.

Assessment of Harvestable Shellfish Waters Use Support

Data collected pursuant to Interstate Shellfish Sanitation Conference/National Shellfish Sanitation Program requirements, as reported to the U.S. Food and Drug Administration, were evaluated for the Delaware Bay from the New Castle/Kent County Line to Cape Henlopen. In addition, Ocean waters from Cape Henlopen to the Maryland Line were evaluated, in addition to Delaware's Inland Bays, including Rehoboth Bay, Indian River Bay, and the Delaware portion of Assawoman Bay. Little Assawoman Bay is not monitored under Delaware's Shellfish Program, as it is not a productive molluscan bivalve growing area. All waters of the State classified as other-than-Approved (Seasonally Approved or Prohibited) are classified as such due to the potential for contamination (for example, an elicit discharge), a lack of bacteriological data, the need to provide enforceable boundaries, or other administrative reason. No closures (a downgrading of the shellfish harvesting use) have occurred over the past five years as a result of bacteriological water quality data. Therefore, bacteria TMDLs are not currently required for Delaware's shellfish waters.

Assessment of Ammonia Toxicity in Freshwaters

Total ammonia, pH, and temperature data during the assessment period for more than 4900 sampling events in freshwaters was evaluated. Of those sampling events there were seven that showed expected toxicity to aquatic life at a single station, Browns Branch at Rt. 14 Bridge (see the table below). The Browns Branch station is in a watershed with a TMDL in place for nitrogen. The TMDL requires the nearby point source to control nitrogen and thus ammonia emissions. The current TMDL addresses the ammonia discharge indirectly by controlling the total nitrogen levels in the discharge of the point source.

Ammonia Toxicity at Browns Branch, STORET station 206041

Date Sampled	Ammonia as N, Total, mg/l	pH	Temperature, Water	Chronic Early Life Stages	Fraction of ELS

				(ELS) Present Criteria	Criteria
9/10/2002	5.92	6.29	19.37	4.99	118.6%
9/17/2002	3.66	7.15	23.26	3.15	116.2%
8/4/2004	5.86	6.7	20.9	4.27	137.3%
9/22/2004	6.69	6.87	16.54	5.42	123.4%
7/13/2005	5.17	6.79	20.99	4.16	124.3%
6/26/2007	4.44	7.17	19.71	3.92	113.3%
7/10/2007	4.12	6.93	23.6	3.37	122.1%
7/30/2007	13.4	6.69	22.13	3.95	339.1%

Dissolved Oxygen Continuous Monitoring Data

The Department is conducting a continuous monitoring program in various waters of the State, with a long-term goal of continuous monitoring in major water bodies throughout the State. The stations use monitoring units (YSI multiparameter datasonde, model 6600 series) that can be deployed for weeks in the field to monitor dissolved oxygen and other parameters of interest on a frequent basis and record that data for later collection. The Department has permanent monitoring stations in the Nanticoke and Murderkill Rivers, at the Millsboro Dam, in Noxontown Pond, the Fennimore Bridge in the Appoquinimink River and at the Woodland Ferry. Data collected by the University of Delaware's Dr. William Ullman in the Canal during 2005 was made available to the Department and is summarized here. A summary of the results from all stations is presented below.

Location	# readings	UCL of 1st %tile	# readings below 4	% readings below 4	# Daily Averages	# Daily Averages Below 5	% Daily Avg Below 5
Fennimore Bridge 2007	1822	4.16	0	0%	20	0	0%
L-R Henlopen 2005	2452	1.53	2219	90%	27	26	96%
L-R Jamieson 2005	419	3.54	13	3%	6	0	0%
L-R Krick 2005	1614	1.13	1316	82%	29	28	97%
Millsboro Dam 2005	2499	4.97	0	0%	27	0	0%
Murderkill 2003	11275	3.45	438	4%	123	14	11%
Murderkill 2004	6516	2.13	1429	22%	72	21	29%
Murderkill 2005	3406	2.57	711	21%	38	9	24%
Murderkill 2007	2206	1.65	728	33%	24	10	42%
Nanticoke 2003	3219	8.96	0	0%	34	0	0%

Location	# readings	UCL of 1st %tile	# readings below 4	% readings below 4	# Daily Averages	# Daily Averages Below 5	% Daily Avg Below 5
Noxontown Pond 2004	666	5.48	0	0%	8	0	0%
Noxontown Pond 2007	3934	4.56	0	0%	42	0	0%
Woodland Ferry 2007	1295	6.09	0	0%	21	0	0%

Causes/Stressors and Sources of Impairment of Designated Uses

Nutrients, low dissolved oxygen, and biology and habitat degradation were the leading cause of nonsupport of Aquatic Life uses. A direct correspondence was found between the trend in biological quality and the quality of physical habitat. Habitat degradation may result in exceedences of the dissolved oxygen and temperature criteria. Sources of biological and habitat impairment are due to nonpoint source pollution mainly from urban and agricultural runoff.

Pathogenic indicators (bacteria) are the most widespread pollutants impacting designated uses. The pathogen indicator monitored by the State for primary contact recreation is Enterococcus bacteria. Other pathogen indicators, such as total coliform and fecal coliform bacteria, are monitored to regulate shellfish harvesting areas. Indicator organisms are not a threat to human health or aquatic life, but their presence in abundant numbers signals an increased probability that disease causing organisms may be present.

Although pathogenic indicators are the most widespread contaminant in the State, nutrients and toxics pose the most serious threats to water quality, aquatic life, and human health. Most of the State's estuarine waters are considered nutrient enriched. Water quality and aquatic life impacts from nutrient enrichment include eutrophication and low dissolved oxygen levels. A large portion of the nutrients are transported to the estuaries and lakes by the rivers and ground water. The presence of toxics has resulted in fish consumption advisories in three basins within Delaware, including Red Clay Creek, Red Lion Creek, St. Jones River and the Delaware Estuary. Several other basins are considered threatened by toxic contamination.

Due to the ubiquitous nature of many pollutants such as pathogen indicators, positive identification of specific sources, and their relative impact, is difficult. Hence, multiple sources are cited for most cases. Agricultural runoff, nonpoint sources, urban runoff, and municipal and industrial point sources are the primary sources of nutrients and toxics.

Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
Appoquinimink River	DE 010-001-01	109091	Delaware River (Appoquinimink at Mouth)	4.1	28	50	1	28	5.9	1	--	--	28	0.1895	5
		109121	Rt. 9 Bridge (East)	3.8	31	55	1	30	5.0	5	2	5	30	0.211	5
		109141	Mouth of East Br. Drawyer Creek	3.5	28	77	1	28	4.7	5	--	--	28	0.207	5
	DE 010-001-02	109041	Rt. 13 Bridge below Odessa	1.9	31	90	1	30	5.4	5	4	5	31	0.197	5
		109051	Rt. 299 Bridge, Odessa	2.5	31	90	1	30	4.4	5	2	5	31	0.1865	5
		109151	Above West Br. Drawyer Creek	3.2	28	84	1	28	4.3	5	3	5	28	0.187	5
		109171	MOT Gut (Appo Gut) - West Bank	2.8	28	105	5	28	4.3	5	3	5	28	0.2	5
	DE 010-001-03	109071	Drawyer Creek, Rt 13	2.1	29	96	1	30	5.6	1	1	1	31	0.282	5
	DE 010-L01	109131	Noxontown Pond Overflow, Rd 38	0.6	27	27	1	30	8.1	1	--	--	31	0.076	1
	DE 010-L02	109031	Silver Lake Overflow, Rd 442	0.2	21	22	1	30	8.8	1	--	--	31	0.043	1
	DE 010-L03	109191	Shallcross Lake Overflow, Dischrg Drawer Cr, Rd. 428	0.2	25	28	1	30	8.0	1	--	--	31	0.06	1
Army Creek	DE 020-001	114011	Rt. 9 Below Llangollen Wells	0.7	30	152	5	31	4.6	5	7	5	31	0.158	5
		114041	Trib Army Creek, Rt. 13 S. of Hares Corner	0.5	12	370	5	12	4.2	5	1	1	12	0.187	5
	DE 020-002	114021	Rt. 13 Bridge	0.3	28	499	5	28	5.4	5	3	5	28	0.153	5
	DE 020-003	114051	Trib Army Creek at Rt. 13 and Rt. 40	0.3	14	313	5	14	6.7	1	--	--	14	0.097	1
Blackbird Creek	DE 030-001	110021	Rt. 13 (Northern Branch)	0.8	30	138	5	31	6.9	1	--	--	31	0.09	1
		110031	Rd 455, Blackbird Landing	1.6	15	119	5	15	4.9	5	2	5	15	0.235	5
		110041	Rt. 9 Taylors Bridge	3.5	30	63	1	31	4.5	5	3	5	31	0.246	5
		110061	2.21 Miles From Mouth	4.7	8	ID	3	8	ID	3	1	1	8	ID	3
	DE 030-002	110011	Road 463 East of RR Tracks	0.8	14	79	1	14	7.3	1	--	--	14	0.098	1
		110101	Blackbird Creek Rd. 472	1.0	15	185	5	15	5.9	1	--	--	15	0.0725	1
		110111	Barlow Branch downstream of Rd. 460	0.7	14	219	5	15	7.3	1	--	--	15	0.089	1
	DE 030-003	110091	Beaver Branch upstream of Rd. 456	1.5	15	234	5	15	4.1	5	2	5	15	0.206	5
Brandywine Creek	DE 040-001	104011	Footbridge in Brandywine State Park	0.2	34	187	5	34	8.1	1	--	--	34	0.154	5
	DE 040-002	104021	Rd. 279 Bridge (USGS guage 014)	0.2	30	244	5	34	8.4	1	--	--	34	0.163	5
		104051	Smith Bridge	0.2	30	161	5	33	7.7	1	--	--	31	0.123	5
Broad Creek	DE 050-006-03	304671	Raccoon Prong at Rd. 66	0.9	29	116	5	29	3.3	5	6	5	29	0.132	5
	DE 050-L03	307171	Horseys Pond 50 Yards Above Spillway 50% RB	0.9	31	43	1	31	7.0	1	--	--	31	0.11	5
	DE 050-L04	307011	Records Pond at Rt. 13	0.9	28	27	1	31	7.7	1	--	--	31	0.085	1

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
Broadkill River	DE 060-001	303041	Rt. 1 Bridge (Mainstem)	1.0	29	189	5	30	5.5	1	4	5	30	0.181	5
		303061	0.10 Miles From Mouth	25.9	9	ID	3	9	ID	3	--	--	9	ID	3
		303081	2.14 Miles From Mouth	18.9	9	ID	3	9	ID	3	--	--	9	ID	3
	DE 060-002	303171	Beaverdam Creek at Rd. 88	0.5	29	154	5	30	6.4	1	--	--	30	0.134	5
		303181	Beaverdam Creek above Rd. 259, Hunters Mill Pond	0.4	30	235	5	30	6.5	1	--	--	30	0.251	5
		303211	Beaverdam Creek at Road 257 Bridge	0.7	9	ID	3	9	ID	3	--	--	9	ID	3
		303491	Beaverdam Creek at Rd. 293	1.0	8	ID	3	8	ID	3	1	1	7	ID	3
	DE 060-003	303031	Rt. 5 Bridge	0.6	30	44	1	30	8.3	1	--	--	30	0.0615	1
		303131	11.5 Miles From Mouth	0.8	9	ID	3	9	ID	3	--	--	9	ID	3
	DE 060-004	303311	Round Pole Branch at Rd. 88	0.2	28	143	5	29	5.4	5	2	5	29	0.12	5
	DE 060-005	303011	Ingram Branch, Savanah Ditch at Rd. 246	0.5	30	135	5	30	5.3	5	1	1	30	0.467	5
		303021	Ingram Branch at Rd. 248	0.3	30	275	5	30	7.8	1	--	--	30	0.12	5
		303241	Ingram Branch at Road 319	0.4	9	ID	3	9	ID	3	--	--	9	ID	3
		303261	Savannah Ditch S of Rd 245 & 246 Int	0.4	9	ID	3	9	ID	3	1	1	9	ID	3
		303281	Savannah Ditch 0.5 N Of Townsend Ef	0.6	9	ID	3	9	ID	3	3	5	9	ID	3
	DE 060-006	303341	Pemberton Branch at Rt. 30 above Wagamons Pond	0.9	29	195	5	30	7.1	1	1	1	30	0.046	1
	DE 060-007-01	303051	Red Mill Pond at Rt. 1	0.9	24	36	1	30	9.8	1	--	--	30	0.159	5
	DE 060-007-02	303406	Martin Branch, Upstream Of Road 261	1.0	9	ID	3	9	ID	3	--	--	9	ID	3
	DE 060-008	303481	Ingrams Branch at Rt. 30 above Waples Pond	1.0	25	43	1	26	1.4	5	14	5	26	0.273	5
	DE 060-L01	303231	Trib. to Red mill Pond at Rd. 261	0.9	30	99	1	30	8.0	1	--	--	30	0.107	5
	DE 060-L02	303351	Wagamons Pond Outlet at County Rd. 250	0.6	29	32	1	30	8.7	1	--	--	30	0.0645	1
	DE 060-L03	303331	Waples Pond at Rt. 1	0.9	25	22	1	30	8.4	1	--	--	29	0.032	1
		303381	Sowbridge Branch at Rd. 212, Waples Pond	1.0	29	79	1	30	5.8	1	1	1	29	0.028	1
Buntings Branch	DE 070-001	311041	Buntings Branch at Rt. 54	0.7	31	568	5	31	6.7	1	--	--	31	0.233	5
	DE 080-001	301021	Rd. 212, Swiggetts Pond	0.9	28	22	1	28	8.1	1	--	--	29	0.026	1
		301031	Rt. 1 Bridge	0.6	29	88	1	31	6.5	1	--	--	30	0.153	5

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
Cedar Creek		301091	Rt. 36 Bridge	18.7	31	51	5	31	4.0	5	6	5	30	0.215	5
	DE 080-002	301011	Clendaniel Pond at Rd 38	1.0	15	53	1	16	7.8	1	--	--	15	0.049	1
		301041	Cubbage Pond Outlet at Road 214	1.0	15	28	1	16	9.0	1	--	--	14	0.098	1
		301051	Hudson Pond Outlet at Road 213	1.0	16	229	5	16	6.3	1	--	--	14	0.0615	1
		301061	Rt 113, Above Hudson Pond	1.0	16	200	5	16	3.8	5	8	5	14	0.049	1
		301071	Church Branch at Road 214	0.9	16	239	5	16	6.4	1	--	--	13	0.036	1
		301151	Cedar Creek Mill Pond, middle at Rd. 224	1.0	16	37	1	16	8.2	1	--	--	13	0.039	1
		301161	Middle of Hudson Pond	1.0	15	170	5	16	2.9	5	7	5	15	0.0485	1
	DE 080-003	301141	Slaughter Creek at Rd. 224	11.0	16	232	5	16	2.2	5	6	5	15	0.256	5
Chesapeake & Delaware Canal	DE 090-001	108021	St. Georges Bridge	2.4	27	26	1	29	6.7	1	--	--	29	0.195	5
		108031	Summit Bridge	1.6	23	34	1	28	6.9	1	--	--	29	0.147	5
	DE 090-L01	108111	Lums Pond Boat Ramp	0.7	29	38	1	29	8.2	1	--	--	29	0.073	1
Chesapeake Drainage System	DE 100-002	112021	Sewell Branch at Rd. 95	0.7	30	162	5	30	4.7	5	5	5	29	0.305	5
	DE 100-003	112031	Gravelly Run at Stilltown Blanco Rd., MD	0.5	30	198	5	30	5.8	1	--	--	30	0.3015	5
Choptank	DE 110-001	207081	Tappahanna Ditch at Rd. 222	0.8	28	115	5	29	6.5	1	--	--	29	0.158	5
	DE 110-002	207091	Culbreth Marsh at Rd. 210	0.9	29	134	5	29	5.7	1	--	--	29	0.184	5
	DE 110-003	207021	Cow Marsh Creek at Rd. 208	0.9	29	71	1	29	6.4	1	--	--	29	0.088	1
		207111	White Marsh Branch at Rd. 268	0.8	29	104	5	29	6.4	1	--	--	29	0.097	1
Christina River	DE 120-001	106011	Rt. 13/Rt. 9 Bridge	0.4	34	201	5	34	6.0	1	--	--	34	0.125	5
		106291	Conrail Bridge (USGS tide gage 01481602) Up river from Port	0.4	30	152	5	31	6.1	1	--	--	31	0.116	5
	DE 120-002	106021	Rt. 141 Drawbridge, Newport (USGS tide gage 01480065)	0.2	34	263	5	34	6.7	1	2	5	34	0.125	5
	DE 120-003	106031	Smalley's Dam Spillway	0.4	32	192	5	31	7.0	1	--	--	32	0.089	1
	DE 120-004-01	106141	Rt. 72, Below Newark (USGS guage 01478000)	0.3	31	200	5	33	7.8	1	--	--	30	0.065	1
	DE 120-006	106191	Rt. 273, Above Newark	0.3	31	258	5	32	9.0	1	--	--	29	0.063	1
	DE 120-007-01	106281	Little Mill Creek at atlantic Avenue (USGS Gage 01480095)	0.3	31	337	5	31	8.5	1	--	--	31	0.11	5
Dragon Run Creek	DE 130-001	111011	Rt. 9 Bridge	0.5	28	92	1	32	2.8	5	10	5	32	0.134	5
		111021	at Road 378	0.4	13	119	5	14	2.4	5	6	5	14	0.081	1
	DE 130-002	111031	Rt. 13 Bridge (flow at Rd. 407), Dragon Creek	0.3	29	158	5	31	2.3	5	8	5	31	0.06	1
		111041	Road 407	0.8	15	160	5	15	5.9	1	--	--	15	0.085	1

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
		111081	Dragon Run at Rt. 71	0.9	14	193	5	16	7.6	1	--	--	16	0.077	1
Indian River	DE 140-001	312011	White Creek at the mouth of Assawoman Canal	23.3	30	30	1	32	5.5	1	1	1	32	0.109	5
	DE 140-002	308361	Blackwater Creek at Rd. 54	0.3	31	229	5	31	4.3	5	5	5	31	0.142	5
	DE 140-003	308091	Pepper Creek at Rt. 26	0.5	32	204	5	37	7.7	1	--	--	35	0.141	5
		308461	Deep Hole Banch at Rd. 382	0.3	28	209	5	28	5.3	5	2	5	28	0.232	5
	DE 140-004	306181	Buoy 49, Indian River	15.4	28	28	1	31	5.3	1	1	1	32	0.207	5
		306191	Buoy 55, Indian River	11.9	32	40	5	31	5.5	1	1	1	32	0.221	5
		306341	Island Creek, upper third	16.3	29	21	1	31	4.6	5	3	5	32	0.158	5
	DE 140-005	308301	Swan Creek, Rd. 304	0.9	32	201	5	32	8.5	1	--	--	30	0.03	1
		308341	Swan Creek at Rd. 297	0.9	31	147	5	31	8.2	1	--	--	26	0.041	1
	DE 140-006	308281	Cow Bridge Branch Rd. 48	0.9	31	59	1	32	7.3	1	--	--	32	0.087	1
	DE 140-E01	306121	Buoy 20, Indian River Bay	28.4	15	12	1	31	6.8	1	--	--	32	0.064	1
		306131	Buoy 26, Indian River Bay	25.4	23	11	1	31	6.3	1	--	--	31	0.106	5
		306321	Indian River Inlet	29.4	10	15	1	32	6.4	1	--	--	32	0.065	1
	DE 140-E02	306161	Buoy 38, Indian River	18.3	30	17	1	31	5.4	1	3	5	32	0.133	5
		306331	Island Creek mouth	18.6	30	18	1	31	5.3	1	2	5	32	0.153	5
	DE 140-L01	308071	Millsboro Dam Overflow	0.9	29	38	1	32	8.9	1	--	--	32	0.047	1
Iron Branch	DE 150-001	309021	Iron Branch at Rt. 113 Bridge	0.9	32	163	5	31	6.5	1	--	--	32	0.075	1
		309041	Whartons Branch at Rt. 334 Bridge	0.7	32	202	5	37	7.3	1	--	--	35	0.132	5
Leipsic River	DE 160-001	202031	DE Rt. 9 Bridge	7.9	32	94	5	32	3.5	5	10	5	32	0.321	5
		202161	Whitehall Landing, Boat Ramp	9.8	14	76	5	14	4.0	5	3	5	14	0.379	5
	DE 160-002	202041	Rt. 42	1.4	31	101	5	32	4.9	5	3	5	32	0.311	5
		202191	Upstream of Masseys Millpond at Rt. 15	0.4	16	166	5	16	6.4	1	--	--	16	0.2285	5
	DE 160-003	202151	Garrisons Lake, Willis Branch at Rd 92	0.6	16	206	5	15	6.1	1	--	--	16	0.276	5
		202181	Dyke Branch at Rt. 42	5.7	16	135	5	16	2.8	5	6	5	16	0.33	5
		202211	Duck Creek at Rt. 6	8.1	16	52	5	16	5.2	1	1	1	16	0.275	5
	DE 160-004	202171	Muddy Branch at Rd. 86	6.1	16	119	5	16	2.7	5	8	5	16	0.329	5
	DE 160-L01	202021	Rt. 13 Bridge, Garrisons Lake	0.4	27	57	1	32	6.7	1	1	1	32	0.334	5
		202141	Garrisons Lake,100 Yds Abv Spillway, 50% RB	0.6	14	52	1	15	5.3	5	1	1	15	0.433	5
	DE 160-L02	202011	Rd. 42 Bridge at Masseys MIllpond	3.2	31	78	1	32	3.7	5	6	5	32	0.306	5
		202201	Middle of Masseys Millpond	0.5	15	112	5	15	6.7	1	--	--	15	0.3015	5
		305011	Canal Rt. 1	24.5	28	24	1	32	4.2	5	4	5	32	0.12	5

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
Lewes and Rehoboth Canal	DE 170-001	305041	Lewes and Rehoboth Canal at Rd. 18 Bridge	24.2	30	21	1	32	4.3	5	10	5	32	0.107	5
		305081	Munchy Branch at Rd. 270a	0.5	31	217	5	32	4.4	5	5	5	32	0.072	1
Little Assawoman Bay	DE 180-001	312041	Assawoman Canal, Rd. 361 Bridge	17.1	31	91	5	31	3.8	5	6	5	31	0.097	1
	DE 180-002	310101	Beaver Dam Ditch, Rd. 363, Miller Branch	6.8	32	119	5	32	3.9	5	6	5	32	0.113	5
		310121	Beaverdam Ditch at Rd. 368	0.2	30	172	5	30	5.3	5	--	--	30	0.095	1
	DE 180-003	310031	Dirrickson Creek, Rd. 381	8.5	32	101	5	32	5.7	1	2	5	32	0.372	5
	DE 180-E01	310011	Little Assawoman Bay Ditch at Rd. 58 Bridge	23.9	29	16	1	32	5.1	1	--	--	32	0.071	1
		310071	Little Assawoman Bay, Mid-Bay	21.8	23	21	1	31	5.3	1	1	1	31	0.088	1
Little River	DE 190-001-01	204031	Rt. 9 Bridge	9.5	30	230	5	32	4.3	5	5	5	32	0.384	5
		204071	Little Creek Wildlife Area Levee	14.6	9	ID	3	9	ID	3	1	1	9	ID	3
	DE 190-001-02	204041	Rt. 8 Bridge	0.3	31	108	5	32	3.5	5	12	5	32	0.162	5
	DE 190-001-03	204011	Pipe Elm Branch, Postles Corner Road (Rd. 348)	0.5	30	124	5	32	5.7	1	2	5	32	0.086	1
		204021	Pipe Elm Branch at S. Little Creek Rd	6.5	16	323	5	16	3.5	5	4	5	16	0.463	5
Marshyhope Creek	DE 200-001	302021	Rt. 404 Bridge, (Woodenhawk Bridge)	0.9	29	47	1	30	8.0	1	--	--	30	0.075	1
		302031	Rd. 308 Bridge	0.9	59	55	1	63	#N/A	3	--	--	63	#N/A	3
		302061	Marshyhope Creek @ Bloomery Rd.	1.0	5	ID	3	5	ID	3	--	--	5	ID	3
	DE 210-001	208021	Rt. 1 Bridge	0.9	31	119	5	31	6.4	1	1	1	30	0.186	5
		208051	Jetty at Mouth	22.8	14	39	5	15	5.3	1	--	--	15	0.304	5
		208061	1.09 miles from mouth at lighthouse	21.0	30	33	1	30	5.2	1	--	--	30	0.261	5
		208101	3.85 miles from mouth, Revills Landing	9.7	28	92	5	27	2.3	5	10	5	27	0.161	5
		208121	7.48 miles from mouth, mouth of Fishing Branch	5.0	27	163	5	26	2.4	5	11	5	26	0.159	5
		208271	Mouth of Grecos Canal	20.4	15	47	5	15	5.0	1	1	1	15	0.248	5
		301081	Confluence: Milpillion And Cedar Ck	21.7	16	39	5	16	3.9	5	3	5	15	0.247	5
	DE 210-002	208241	Tantrough Branch, Abbots Pond Rd.	1.0	16	358	5	16	8.3	1	--	--	15	0.042	1
	DE 210-003	208261	Johnson Branch at Rt. 36	1.0	16	179	5	16	7.6	1	--	--	15	0.104	5
	DE 210-003	208371	Downstream from Griffith Lake outfall at Rd. 633	1.0	16	75	1	16	8.2	1	--	--	15	0.039	1

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
Mispillion River	DE 210-004	208351	Bowman Branch at Rd. 634	0.9	15	431	5	15	6.7	1	--	--	12	0.123	5
		208361	Lednum Branch at Rd. 443	0.4	16	176	5	16	7.4	1	--	--	14	0.064	1
	DE 210-005	208221	Tub Mill Branch, Rd. 404	0.3	16	122	5	16	7.3	1	--	--	14	0.118	5
		208281	Kings Causeway Branch at Rd. 123	3.5	15	154	5	16	2.8	5	4	5	14	0.198	5
		208291	Fishing Branch at Rd. 124	2.0	16	248	5	16	3.2	5	4	5	15	0.136	5
		208301	Swan Creek at downstream side of Rt. 113	1.6	24	236	5	24	3.6	5	5	5	23	0.16	5
		208331	Mullet Run at Rt. 14	1.0	16	193	5	16	6.6	1	--	--	14	0.055	1
	DE 210-L01	208311	Middle of Tub Mill Pond	0.4	15	42	1	16	6.4	1	1	1	14	0.206	5
		208211	Rt. 36 Silver Lake	0.9	30	32	1	31	7.8	1	--	--	30	0.073	1
		208321	Middle of Silver Lake	0.9	16	44	1	16	7.1	1	--	--	14	0.08	1
	DE 210-L03	208011	Haven Lake at Rt. 113	1.0	28	29	1	31	7.9	1	--	--	30	0.053	1
		208341	Middle of Haven lake	1.0	16	53	1	16	7.5	1	--	--	14	0.06	1
	DE 210-L04	208381	Middle of Griffith Lake	1.0	14	31	1	16	7.6	1	--	--	15	0.035	1
	DE 210-L05	208191	Blairs Pond off Rd. 443	1.0	29	55	1	31	8.3	1	--	--	30	0.059	1
		208231	Beaverdam Branch, Rd. 384	0.9	31	222	5	31	7.5	1	--	--	29	0.08	1
		208391	Middle of Blairs Pond at Rd. 443	1.0	16	71	1	16	6.5	1	1	1	14	0.103	5
	DE 210-L06	208181	Abbotts Pond at Rd. 620	1.0	31	54	1	31	7.8	1	1	1	29	0.065	1
		208401	Middle of Abbotts Pond	1.0	16	65	1	16	5.4	5	3	5	14	0.1505	5
Murderkill River	DE 220-001	206091	US Rt. 113 at Frederica By-Pass	3.0	36	108	5	36	3.7	5	6	5	36	0.315	5
		206101	Bowers Beach Wharf	20.6	34	29	1	35	5.2	1	4	5	35	0.248	5
		206131	1.25 miles from the mouth at Webs Landing	18.6	35	41	5	36	4.3	5	5	5	36	0.244	5
		206141	3.25 miles from the mouth	11.1	35	87	5	36	3.3	5	12	5	36	0.337	5
		206231	Confluence of Kent County STP trib.	5.0	36	114	5	36	3.1	5	11	5	36	0.445	5
		206711	Murderkill River near power lines (4.45 river mile	10.7	9	ID	3	9	ID	3	6	5	9	ID	3
	DE 220-002	206081	Spring Creek at Rt. 12 Bridge	2.6	36	137	5	36	4.2	5	10	5	36	0.302	5
		206561	Double Run at Rd. 371	0.4	38	213	5	37	5.3	5	--	--	38	0.2175	5
		206641	Spring Creek, Pratt Branch at Canterbury Rd.	0.3	6	ID	3	6	ID	3	--	--	6	ID	3
	DE 220-004	206041	Browns Branch at Rt. 14 Bridge	0.3	38	121	5	37	5.5	1	1	1	38	0.065	1
		206051	Browns Branch at Rd. 384 Bridge	0.5	38	172	5	37	6.9	1	--	--	37	0.054	1
	DE 220-005	206011	US Rt. 13 Bridge below Felton	0.7	37	200	5	37	7.1	1	--	--	38	0.117	5

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
	DE 220-L01	206461	Hudson Branch, McGinnis Pond, Rd. 378	0.5	33	45	1	37	9.3	1	--	--	38	0.078	1
	DE 220-L02	206071	Andrews Lake at Rd. 380 Bridge	0.3	33	28	1	37	7.6	1	--	--	37	0.07	1
	DE 220-L03	206451	Coursey Pond at Rd. 388 Bridge	0.7	35	40	1	37	8.5	1	--	--	38	0.146	5
	DE 220-L05	206361	McCauley Pond near spillway	0.3	32	25	1	37	8.5	1	--	--	38	0.083	1
Naamans Creek	DE 230-001-02	101021	Naamans Road	0.2	35	320	5	37	7.6	1	2	5	35	0.077	1
		101031	South Branch at Darley Rd.	0.2	35	224	5	37	7.9	1	--	--	36	0.063	1
		101041	Rt. 13A	0.2	33	295	5	33	7.5	1	1	1	31	0.0605	1
		101051	South Branch at Glenrock Rd.	0.1	7	ID	3	7	ID	3	--	--	7	ID	3
		101061	South Branch at Marsh Rd.	0.1	7	ID	3	7	ID	3	--	--	7	ID	3
		101071	South Branch at Decatur Rd.	0.1	8	ID	3	8	ID	3	--	--	8	ID	3
Nanticoke River	DE 240-001	304011	Sharptown, Maryland Rt 313	0.8	30	27	1	28	5.2	5	2	5	31	0.085	1
		304041	Middleford Bridge	0.9	30	66	1	31	6.8	1	--	--	31	0.058	1
		304071	Buoy 45 (State Line)	0.8	26	26	1	28	5.2	5	1	1	31	0.092	1
		304091	Buoy 51 (Conf. Broad Creek)	0.8	29	20	1	28	5.7	1	--	--	31	0.082	1
		304151	Buoy 66 (Conf DuPont Gut)	0.9	30	32	1	27	5.5	1	--	--	31	0.076	1
		304461	Seaford STP Discharge	0.9	30	69	1	28	5.6	1	--	--	31	0.1	1
		304471	Rt. 13 Bridge	0.8	28	57	1	30	5.9	1	1	1	30	0.076	1
	DE 240-002	304191	Rd. 545 Mainstem Nanticoke	0.9	55	92	1	57	7.4	1	--	--	56	0.0925	1
		304291	Rd. 600 Bridge	0.9	31	51	1	31	7.8	1	--	--	31	0.0475	1
	DE 240-003	304381	Bucks Branch at Rd. 546	0.8	29	99	1	30	6.9	1	--	--	30	0.111	5
	DE 240-005	316011	Gravelly Branch at Rd. 525 Bridge	0.9	28	80	1	36	6.8	1	--	--	32	0.04	1
	DE 240-L02	304311	Concord Pond overflow	0.9	28	27	1	31	7.7	1	--	--	31	0.053	1
	DE 240-L04	304321	Williams Pond, below the pond at Rd. 535	0.8	28	27	1	31	8.1	1	--	--	31	0.13	5
Pocomoke River	DE 250-001	313011	Rd. 419 Bridge	0.9	27	168	5	27	6.3	1	--	--	28	0.172	5
Red Clay Creek	DE 260-001	103011	Stanton, Rt. 4 at Stanton Bridge (USGS gage 01480015)	0.2	31	177	5	32	8.8	1	--	--	32	0.168	5
		103031	Wooddale, Rt. 48 (USGS gage 01480000)	0.2	31	119	5	31	8.8	1	--	--	31	0.161	5
		103041	Ashland, Rd. 258a	0.2	31	154	5	33	8.3	1	--	--	32	0.197	5
	DE 260-002	103061	Burrough's Run at Creek Rd. (Rt. 82)	0.3	30	158	5	33	8.6	1	--	--	32	0.06	1
Red Lion Creek	DE 270-001-01	107031	Rt. 9 Bridge	0.2	31	285	5	31	5.0	5	2	5	31	0.122	5
		107061	Unnamed tributary at Rd. 405	0.5	14	244	5	15	7.9	1	--	--	14	0.055	1
		107011	Rt. 7	0.6	30	199	5	32	7.1	1	--	--	32	0.061	1

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Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
Red Lion Creek	DE 270-001-02	107041	De Rt 71 Between De Rt 7 And US Rt 13	0.5	14	211	5	15	5.6	1	--	--	15	0.083	1
		107071	Doll Run at Rd. 405	0.2	15	126	5	15	7.0	1	--	--	15	0.076	1
Rehoboth Bay	DE 280-001-01	308051	Guinea Creek at Rt. 298 Bridge	7.8	32	158	5	32	6.5	1	1	1	32	0.0945	1
	DE 280-002	308291	Love Creek, Rd. 277	0.9	28	27	1	32	6.8	1	1	1	32	0.03	1
		308371	Bundick's Branch at Rt. 23	0.9	31	263	5	31	7.2	1	--	--	31	0.044	1
	DE 280-E01	306071	Buoy 3, Rehoboth Bay	27.6	10	11	1	32	6.5	1	--	--	32	0.098	1
		306091	Buoy 7, Rehoboth Bay	28.4	13	8	1	31	6.7	1	--	--	32	0.077	1
		306111	Massey's Ditch at Bouy 17	29.2	15	8	1	31	6.1	1	--	--	32	0.063	1
	DE 280-L01	308031	Burton Pond, Rd. 24	0.9	31	38	1	32	7.4	1	--	--	32	0.033	1
Saint Jones River	DE 290-001-01	205011	at Bowers Beach,Mouth Of Del.Bay	18.2	8	ID	3	9	ID	3	1	1	9	ID	3
		205031	2.2 Miles From Mouth	12.4	9	ID	3	9	ID	3	3	5	9	ID	3
		205041	3.5 miles from mouth at Barkers Landing	11.7	32	102	5	30	3.4	5	8	5	32	0.279	5
		205061	4.58 miles from mouth; at Gravel Pit	4.9	8	ID	3	9	ID	3	3	5	9	ID	3
	DE 290-001-02	205091	Rt. 10 Bridge near DAFB	4.0	32	112	5	30	4.7	5	3	5	32	0.27	5
		205131	Route 13 Near Dover	1.6	9	ID	3	9	ID	3	--	--	9	ID	3
		205571	Division Street (Dover)	0.7	31	74	1	30	5.1	5	3	5	32	0.181	5
	DE 290-002	205241	Rt. 13 North Moores Lake, Issacs Branch	0.4	32	200	5	30	5.9	1	--	--	32	0.068	1
		205321	Moores Lake, Issacs Branch at Road 203	0.9	9	ID	3	9	ID	3	--	--	9	ID	3
		205601	Wyoming Pond outfall at Rt. 15	0.6	9	ID	3	9	ID	3	--	--	9	ID	3
	DE 290-003	205151	Rd. 69 State College, Fork Branch	0.7	31	105	5	30	3.9	5	6	5	31	0.238	5
		205171	Fork Br at Rd 156, Nr Reichhold	0.9	9	ID	3	9	ID	3	--	--	9	ID	3
		205271	Silver Lake, Fork Branch at Road 167	0.8	9	ID	3	9	ID	3	--	--	9	ID	3
	DE 290-004	205261	Derby Pd, Tidbury Creek at Road 125	0.4	9	ID	3	9	ID	3	--	--	9	ID	3
		205581	Tidbury Creek at Rd. 105	0.9	9	ID	3	9	ID	3	--	--	9	ID	3
		205591	Voshell Pond outfall at Rd. 360	0.8	9	ID	3	9	ID	3	--	--	9	ID	3
	DE 290-L01	205181	Rt. 13 Alt. Moores Lake	0.5	30	45	1	30	6.6	1	1	1	32	0.071	1
	DE 290-L02	205191	Silver Lake Spillway, Dover City Park	0.7	32	75	1	30	6.5	1	1	1	32	0.1815	5
		205201	Silver Lake at State St., Dover	0.9	8	ID	3	9	ID	3	--	--	9	ID	3

Watershed	Segment	Station	Location Description	Avg. Salinity	Enterococcus Count	Geomean	**Ent Category**	DO Count	DO UCL	**DO Category**	Count Min DO <4	**Min DO Category**	Total Phosphorus Samples	Total P LCL 90th Percentile	**Total P Category**
	DE 290-L03	205211	Derby Pond at Rt. 13A	0.5	30	32	1	30	7.5	1	1	1	32	0.069	1
Shellpot Creek	DE 300-001-01	102041	Cherry Island at Rd. 501 Bridge	0.4	30	198	5	30	4.2	5	4	5	29	0.129	5
	DE 300-001-02	102011	US Rt. 13 Bridge (Gov Printz Blvd)	0.3	30	288	5	30	6.0	1	--	--	28	0.067	1
	DE 300-001-03	102101	Stoney Creek @ Rt. 13	0.3	17	341	5	17	6.7	1	--	--	17	0.143	5
Smyrna River	DE 310-001	201011	Lake Como at US Route 13 Bridge	0.9	16	63	1	16	6.5	1	--	--	15	0.156	5
		201031	Mill Creek at DE Route 6 Bridge	1.5	16	226	5	16	4.3	5	2	5	15	0.237	5
		201041	Rt. 9 Fleming's Landing	5.0	32	113	5	32	4.7	5	3	5	31	0.249	5
		201101	2.07 Miles From Mouth at Shorts Landing	4.8	9	ID	3	9	ID	3	--	--	8	ID	3
	DE 310-002	201021	Rd. 137 Bridge, Mill Creek	0.6	31	79	1	32	7.6	1	--	--	31	0.133	5
		201151	Mill Creek at Rt. 300	0.5	16	165	5	16	5.7	1	--	--	15	0.275	5
	DE 310-003	201051	Rd. 485 Bridge at Smyrna Landing	1.2	32	211	5	32	5.0	5	3	5	31	0.245	5
		201161	Rd. 38 Bridge, Providence Creek	0.3	31	127	5	32	7.5	1	--	--	29	0.0735	1
		201171	Sawmill Branch at Rd. 30	1.9	16	234	5	16	4.0	5	3	5	15	0.23	5
		201181	Downstream of Duck Creek Pond at Rd. 486	0.5	16	118	5	16	7.2	1	--	--	15	0.095	1
		201201	Green Spring Branch at Rd. 47	1.0	16	149	5	17	6.7	1	--	--	13	0.083	1
		201211	Paw Paw Branch at Rd. 483	1.0	16	191	5	16	8.3	1	--	--	14	0.058	1
		201221	Providence Creek at Rd. 483	0.8	16	115	5	16	8.2	1	--	--	14	0.099	1
	DE 310-L01	201141	Lake Como boat ramp	1.0	16	67	1	16	8.2	1	--	--	15	0.18	5
		201191	Middle of Duck Creek Pond	0.3	16	118	5	16	5.4	5	2	5	15	0.1205	5
White Clay Creek	DE 320-001	105011	Stanton, Old Rt. 7 Bridge	0.2	31	209	5	31	8.1	1	--	--	28	0.169	5
		105031	Chambers Rock Rd. (Road 329) near Thompson	0.2	30	159	5	34	9.1	1	--	--	31	0.134	5
		105151	DE Park Race Track (USGS gage 01479000), 35ft downstream	0.2	31	248	5	33	8.2	1	--	--	31	0.153	5
		105171	McKee Lane in Newark	0.1	29	139	5	30	8.7	1	--	--	30	0.1315	5
	DE 320-002	105071	Mill Creek, Above Rt. 4 (DE Park)	0.2	31	278	5	33	8.2	1	--	--	30	0.096	1
	DE 320-003	105101	Pike Creek Confluence, Upper Pike Creek Rd. (Rd. 322)	0.3	32	214	5	30	8.9	1	--	--	29	0.069	1
		105181	Pike Creek at Paper Mill Road	0.4	24	201	5	24	8.9	1	--	--	23	0.056	1
	DE 320-004	105131	Middle Run Confluence, Possum Park Rd. (Rd. 303)	0.8	32	215	5	31	9.5	1	--	--	30	0.081	1

Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	**Total N Category**	DIP Growing Season Ave	**DIP Category**	DIN Growing Season Average	**DIN Category**	**ERES Total Nitrogen Support**	**ERES Total Phosphorus Support**
Appoquinimink River	DE 010-001-01	109091	Delaware River (Appoquinimink at Mouth)	4.1	28	2.4	5	--	--	--	--	--	--
		109121	Rt. 9 Bridge (East)	3.8	31	2.3	5	--	--	--	--	--	--
		109141	Mouth of East Br. Drawyer Creek	3.5	28	2.4	5	--	--	--	--	--	--
	DE 010-001-02	109041	Rt. 13 Bridge below Odessa	1.9	31	3.2	5	--	--	--	--	--	--
		109051	Rt. 299 Bridge, Odessa	2.5	31	2.6	5	--	--	--	--	--	--
		109151	Above West Br. Drawyer Creek	3.2	28	2.3	5	--	--	--	--	--	--
		109171	MOT Gut (Appo Gut) - West Bank	2.8	28	2.2	5	--	--	--	--	--	--
	DE 010-001-03	109071	Drawyer Creek, Rt 13	2.1	31	3.3	5	--	--	--	--	--	--
	DE 010-L01	109131	Noxontown Pond Overflow, Rd 38	0.6	31	2.6	5	--	--	--	--	--	--
	DE 010-L02	109031	Silver Lake Overflow, Rd 442	0.2	31	5.9	5	--	--	--	--	--	--
	DE 010-L03	109191	Shallcross Lake Overflow, Dischrg Drawer Cr, Rd. 428	0.2	31	3.8	5	--	--	--	--	--	--
Army Creek	DE 020-001	114011	Rt. 9 Below Llangollen Wells	0.7	31	1.9	5	--	--	--	--	--	--
		114041	Trib Army Creek, Rt. 13 S. of Hares Corner	0.5	12	2.6	5	--	--	--	--	--	--
	DE 020-002	114021	Rt. 13 Bridge	0.3	28	2.5	5	--	--	--	--	--	--
	DE 020-003	114051	Trib Army Creek at Rt. 13 and Rt. 40	0.3	14	2.3	5	--	--	--	--	--	--
Blackbird Creek	DE 030-001	110021	Rt. 13 (Northern Branch)	0.8	31	2.0	5	--	--	--	--	--	--
		110031	Rd 455, Blackbird Landing	1.6	15	2.1	5	--	--	--	--	--	--
		110041	Rt. 9 Taylors Bridge	3.5	31	1.8	5	--	--	--	--	--	--
		110061	2.21 Miles From Mouth	4.7	8	ID	3	--	--	--	--	--	--
	DE 030-002	110011	Road 463 East of RR Tracks	0.8	14	2.2	5	--	--	--	--	--	--
		110101	Blackbird Creek Rd. 472	1.0	15	1.6	5	--	--	--	--	--	--
		110111	Barlow Branch downstream of Rd. 460	0.7	15	2.4	5	--	--	--	--	--	--
	DE 030-003	110091	Beaver Branch upstream of Rd. 456	1.5	15	1.9	5	--	--	--	--	--	--
Brandywine Creek	DE 040-001	104011	Footbridge in Brandywine State Park	0.2	34	3.7	5	--	--	--	--	--	--
	DE 040-002	104021	Rd. 279 Bridge (USGS guage 014)	0.2	34	3.5	5	--	--	--	--	--	--
		104051	Smith Bridge	0.2	32	3.6	5	--	--	--	--	meets	meets
Broad Creek	DE 050-006-03	304671	Raccoon Prong at Rd. 66	0.9	29	2.2	5	--	--	--	--	--	--
	DE 050-L03	307171	Horseys Pond 50 Yards Above Spillway 50% RB	0.9	31	4.7	5	--	--	--	--	meets	meets
	DE 050-L04	307011	Records Pond at Rt. 13	0.9	31	5.7	5	--	--	--	--	fails	meets

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	Total N Category	DIP Growing Season Ave	DIP Category	DIN Growing Season Average	DIN Category	ERES Total Nitrogen Support	ERES Total Phosphorus Support
Broadkill River	DE 060-001	303041	Rt. 1 Bridge (Mainstem)	1.0	30	4.6	5	--	--	--	--	--	--
		303061	0.10 Miles From Mouth	25.9	9	ID	3	--	--	--	--	--	--
		303081	2.14 Miles From Mouth	18.9	9	ID	3	--	--	--	--	--	--
	DE 060-002	303171	Beaverdam Creek at Rd. 88	0.5	30	8.4	5	--	--	--	--	--	--
		303181	Beaverdam Creek above Rd. 259, Hunters Mill Pond	0.4	30	12.0	5	--	--	--	--	--	--
		303211	Beaverdam Creek at Road 257 Bridge	0.7	9	ID	3	--	--	--	--	--	--
		303491	Beaverdam Creek at Rd. 293	1.0	8	ID	3	--	--	--	--	--	--
	DE 060-003	303031	Rt. 5 Bridge	0.6	30	4.7	5	--	--	--	--	--	--
		303131	11.5 Miles From Mouth	0.8	9	ID	3	--	--	--	--	--	--
	DE 060-004	303311	Round Pole Branch at Rd. 88	0.2	29	4.6	5	--	--	--	--	--	--
	DE 060-005	303011	Ingram Branch, Savanah Ditch at Rd. 246	0.5	30	29.9	5	--	--	--	--	--	--
		303021	Ingram Branch at Rd. 248	0.3	30	9.0	5	--	--	--	--	--	--
		303241	Ingram Branch at Road 319	0.4	9	ID	3	--	--	--	--	--	--
		303261	Savannah Ditch S of Rd 245 & 246 Int	0.4	9	ID	3	--	--	--	--	--	--
		303281	Savannah Ditch 0.5 N Of Townsend Ef	0.6	9	ID	3	--	--	--	--	--	--
	DE 060-006	303341	Pemberton Branch at Rt. 30 above Wagamons Pond	0.9	30	4.8	5	--	--	--	--	--	--
	DE 060-007-01	303051	Red Mill Pond at Rt. 1	0.9	30	3.1	5	--	--	--	--	--	--
	DE 060-007-02	303406	Martin Branch, Upstream Of Road 261	1.0	9	ID	3	--	--	--	--	--	--
	DE 060-008	303481	Ingrams Branch at Rt. 30 above Waples Pond	1.0	26	1.4	5	--	--	--	--	--	--
	DE 060-L01	303231	Trib. to Red mill Pond at Rd. 261	0.9	30	4.8	5	--	--	--	--	--	--
	DE 060-L02	303351	Wagamons Pond Outlet at County Rd. 250	0.6	30	4.8	5	--	--	--	--	--	--
	DE 060-L03	303331	Waples Pond at Rt. 1	0.9	30	4.5	5	--	--	--	--	--	--
		303381	Sowbridge Branch at Rd. 212, Waples Pond	1.0	30	4.0	5	--	--	--	--	--	--
Buntings Branch	DE 070-001	311041	Buntings Branch at Rt. 54	0.7	31	5.5	5	0.037	5	2.742	5	--	--
	DE 080-001	301021	Rd. 212, Swiggetts Pond	0.9	31	4.4	5	--	--	--	--	--	--
		301031	Rt. 1 Bridge	0.6	31	4.4	5	--	--	--	--	--	--

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	Total N Category	DIP Growing Season Ave	DIP Category	DIN Growing Season Average	DIN Category	ERES Total Nitrogen Support	ERES Total Phosphorus Support
Cedar Creek		301091	Rt. 36 Bridge	18.7	31	2.0	5	--	--	--	--	meets	meets
	DE 080-002	301011	Clendaniel Pond at Rd 38	1.0	16	4.3	5	--	--	--	--	--	--
		301041	Cubbage Pond Outlet at Road 214	1.0	16	4.4	5	--	--	--	--	--	--
		301051	Hudson Pond Outlet at Road 213	1.0	16	4.7	5	--	--	--	--	--	--
		301061	Rt 113, Above Hudson Pond	1.0	16	3.3	5	--	--	--	--	--	--
		301071	Church Branch at Road 214	0.9	16	4.4	5	--	--	--	--	--	--
		301151	Cedar Creek Mill Pond, middle at Rd. 224	1.0	16	4.0	5	--	--	--	--	--	--
		301161	Middle of Hudson Pond	1.0	16	3.3	5	--	--	--	--	--	--
	DE 080-003	301141	Slaughter Creek at Rd. 224	11.0	16	3.0	5	--	--	--	--	--	--
Chesapeake & Delaware Canal	DE 090-001	108021	St. Georges Bridge	2.4	29	2.5	5	--	--	--	--	--	--
		108031	Summit Bridge	1.6	29	2.3	5	--	--	--	--	--	--
	DE 090-L01	108111	Lums Pond Boat Ramp	0.7	29	1.9	5	--	--	--	--	--	--
Chesapeake Drainage System	DE 100-002	112021	Sewell Branch at Rd. 95	0.7	29	2.7	5	--	--	--	--	--	--
	DE 100-003	112031	Gravelly Run at Stilltown Blanco Rd., MD	0.5	30	2.0	5	--	--	--	--	--	--
Choptank	DE 110-001	207081	Tappahanna Ditch at Rd. 222	0.8	29	1.8	5	--	--	--	--	--	--
	DE 110-002	207091	Culbreth Marsh at Rd. 210	0.9	29	3.0	5	--	--	--	--	--	--
	DE 110-003	207021	Cow Marsh Creek at Rd. 208	0.9	29	1.9	5	--	--	--	--	--	--
		207111	White Marsh Branch at Rd. 268	0.8	29	5.8	5	--	--	--	--	--	--
Christina River	DE 120-001	106011	Rt. 13/Rt. 9 Bridge	0.4	34	3.0	5	--	--	--	--	--	--
		106291	Conrail Bridge (USGS tide gage 01481602) Up river from Port	0.4	31	3.0	5	--	--	--	--	--	--
	DE 120-002	106021	Rt. 141 Drawbridge, Newport (USGS tide gage 01480065)	0.2	34	3.4	5	--	--	--	--	--	--
	DE 120-003	106031	Smalley's Dam Spillway	0.4	32	2.1	5	--	--	--	--	--	--
	DE 120-004-01	106141	Rt. 72, Below Newark (USGS guage 01478000)	0.3	32	2.6	5	--	--	--	--	--	--
	DE 120-006	106191	Rt. 273, Above Newark	0.3	32	3.0	5	--	--	--	--	--	--
	DE 120-007-01	106281	Little Mill Creek at atlantic Avenue (USGS Gage 01480095)	0.3	32	2.1	5	--	--	--	--	--	--
Dragon Run Creek	DE 130-001	111011	Rt. 9 Bridge	0.5	32	1.5	5	--	--	--	--	--	--
		111021	at Road 378	0.4	14	2.3	5	--	--	--	--	--	--
	DE 130-002	111031	Rt. 13 Bridge (flow at Rd. 407), Dragon Creek	0.3	31	2.2	5	--	--	--	--	--	--
		111041	Road 407	0.8	15	1.7	5	--	--	--	--	--	--

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Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	**Total N Category**	DIP Growing Season Ave	**DIP Category**	DIN Growing Season Average	**DIN Category**	**ERES Total Nitrogen Support**	**ERES Total Phosphorus Support**
		111081	Dragon Run at Rt. 71	0.9	16	2.1	5	--	--	--	--	--	--
Indian River	DE 140-001	312011	White Creek at the mouth of Assawoman Canal	23.3	32	1.5	5	0.015	5	0.439	5	--	--
Indian River	DE 140-002	308361	Blackwater Creek at Rd. 54	0.3	31	8.6	5	0.036	5	4.533	5	--	--
Indian River	DE 140-003	308091	Pepper Creek at Rt. 26	0.5	37	4.1	5	0.027	5	2.013	5	--	--
Indian River	DE 140-003	308461	Deep Hole Banch at Rd. 382	0.3	28	8.3	5	0.066	5	2.711	5	--	--
Indian River	DE 140-004	306181	Buoy 49, Indian River	15.4	32	3.0	5	0.025	5	1.318	5	meets	meets
Indian River	DE 140-004	306191	Buoy 55, Indian River	11.9	32	3.9	5	0.028	5	1.561	5	meets	meets
Indian River	DE 140-004	306341	Island Creek, upper third	16.3	31	2.9	5	0.020	5	1.084	5	--	--
Indian River	DE 140-005	308301	Swan Creek, Rd. 304	0.9	32	4.9	5	0.013	5	4.206	5	--	--
Indian River	DE 140-005	308341	Swan Creek at Rd. 297	0.9	31	3.1	5	0.007	1	2.240	5	--	--
Indian River	DE 140-006	308281	Cow Bridge Branch Rd. 48	0.9	32	2.9	5	0.020	5	1.326	5	--	--
Indian River	DE 140-E01	306121	Buoy 20, Indian River Bay	28.4	31	0.7	1	0.018	5	0.137	1	meets	meets
Indian River	DE 140-E01	306131	Buoy 26, Indian River Bay	25.4	30	1.3	5	0.019	5	0.353	5	meets	meets
Indian River	DE 140-E01	306321	Indian River Inlet	29.4	32	0.8	1	0.029	5	0.524	5	meets	meets
Indian River	DE 140-E02	306161	Buoy 38, Indian River	18.3	32	2.2	5	0.018	5	0.876	5	meets	meets
Indian River	DE 140-E02	306331	Island Creek mouth	18.6	31	2.8	5	0.021	5	1.001	5	meets	meets
Indian River	DE 140-L01	308071	Millsboro Dam Overflow	0.9	32	4.7	5	0.007	1	3.013	5	--	--
Iron Branch	DE 150-001	309021	Iron Branch at Rt. 113 Bridge	0.9	32	4.7	5	0.047	5	2.512	5	--	--
Iron Branch	DE 150-001	309041	Whartons Branch at Rt. 334 Bridge	0.7	37	5.7	5	0.012	5	2.693	5	--	--
Leipsic River	DE 160-001	202031	DE Rt. 9 Bridge	7.9	32	2.1	5	--	--	--	--	--	--
Leipsic River	DE 160-001	202161	Whitehall Landing, Boat Ramp	9.8	14	2.4	5	--	--	--	--	--	--
Leipsic River	DE 160-002	202041	Rt. 42	1.4	32	3.8	5	--	--	--	--	--	--
Leipsic River	DE 160-002	202191	Upstream of Masseys Millpond at Rt. 15	0.4	16	4.5	5	--	--	--	--	--	--
Leipsic River	DE 160-003	202151	Garrisons Lake, Willis Branch at Rd 92	0.6	16	2.8	5	--	--	--	--	--	--
Leipsic River	DE 160-003	202181	Dyke Branch at Rt. 42	5.7	16	2.5	5	--	--	--	--	--	--
Leipsic River	DE 160-003	202211	Duck Creek at Rt. 6	8.1	16	2.1	5	--	--	--	--	--	--
Leipsic River	DE 160-004	202171	Muddy Branch at Rd. 86	6.1	16	2.0	5	--	--	--	--	--	--
Leipsic River	DE 160-L01	202021	Rt. 13 Bridge, Garrisons Lake	0.4	32	2.8	5	--	--	--	--	--	--
Leipsic River	DE 160-L01	202141	Garrisons Lake,100 Yds Abv Spillway, 50% RB	0.6	15	2.7	5	--	--	--	--	--	--
Leipsic River	DE 160-L02	202011	Rd. 42 Bridge at Masseys MIllpond	3.2	32	3.0	5	--	--	--	--	--	--
Leipsic River	DE 160-L02	202201	Middle of Masseys Millpond	0.5	15	4.2	5	--	--	--	--	--	--
		305011	Canal Rt. 1	24.5	31	1.2	5	0.024	5	0.351	5	--	--

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Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	Total N Category	DIP Growing Season Ave	DIP Category	DIN Growing Season Average	DIN Category	ERES Total Nitrogen Support	ERES Total Phosphorus Support
Lewes and Rehoboth Canal	DE 170-001	305041	Lewes and Rehoboth Canal at Rd. 18 Bridge	24.2	31	1.2	5	0.030	5	0.514	5	--	--
		305081	Munchy Branch at Rd. 270a	0.5	32	1.9	5	0.012	5	1.368	5	--	--
Little Assawoman Bay	DE 180-001	312041	Assawoman Canal, Rd. 361 Bridge	17.1	31	1.4	5	0.010	1	0.373	5	meets	meets
	DE 180-002	310101	Beaver Dam Ditch, Rd. 363, Miller Branch	6.8	32	4.9	5	0.021	5	1.799	5	meets	meets
		310121	Beaverdam Ditch at Rd. 368	0.2	30	6.2	5	0.019	5	3.213	5	--	--
	DE 180-003	310031	Dirrickson Creek, Rd. 381	8.5	32	4.0	5	0.059	5	1.162	5	meets	meets
	DE 180-E01	310011	Little Assawoman Bay Ditch at Rd. 58 Bridge	23.9	32	1.2	5	0.010	1	0.235	5	meets	meets
		310071	Little Assawoman Bay, Mid-Bay	21.8	31	1.6	5	0.011	5	0.448	5	meets	meets
Little River	DE 190-001-01	204031	Rt. 9 Bridge	9.5	32	3.1	5	--	--	--	--	--	--
		204071	Little Creek Wildlife Area Levee	14.6	9	ID	3	--	--	--	--	--	--
	DE 190-001-02	204041	Rt. 8 Bridge	0.3	32	2.4	5	--	--	--	--	--	--
	DE 190-001-03	204011	Pipe Elm Branch, Postles Corner Road (Rd. 348)	0.5	32	1.2	5	--	--	--	--	--	--
		204021	Pipe Elm Branch at S. Little Creek Rd	6.5	16	3.4	5	--	--	--	--	--	--
Marshyhope Creek	DE 200-001	302021	Rt. 404 Bridge, (Woodenhawk Bridge)	0.9	30	3.9	5	--	--	--	--	--	--
		302031	Rd. 308 Bridge	0.9	63	#N/A	3	--	--	--	--	--	--
		302061	Marshyhope Creek @ Bloomery Rd.	1.0	5	ID	3	--	--	--	--	--	--
	DE 210-001	208021	Rt. 1 Bridge	0.9	31	5.0	5	--	--	--	--	--	--
		208051	Jetty at Mouth	22.8	16	2.1	5	--	--	--	--	--	--
		208061	1.09 miles from mouth at lighthouse	21.0	31	2.0	5	--	--	--	--	--	--
		208101	3.85 miles from mouth, Revills Landing	9.7	28	3.6	5	--	--	--	--	--	--
		208121	7.48 miles from mouth, mouth of Fishing Branch	5.0	27	4.2	5	--	--	--	--	--	--
		208271	Mouth of Grecos Canal	20.4	16	1.9	5	--	--	--	--	--	--
		301081	Confluence: Milpillion And Cedar Ck	21.7	16	1.8	5	--	--	--	--	--	--
	DE 210-002	208241	Tantrough Branch, Abbots Pond Rd.	1.0	16	8.4	5	--	--	--	--	--	--
	DE 210-003	208261	Johnson Branch at Rt. 36	1.0	16	4.2	5	--	--	--	--	--	--
	DE 210-003	208371	Downstream from Griffith Lake outfall at Rd. 633	1.0	16	5.2	5	--	--	--	--	--	--

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Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	**Total N Category**	DIP Growing Season Ave	**DIP Category**	DIN Growing Season Average	**DIN Category**	**ERES Total Nitrogen Support**	**ERES Total Phosphorus Support**
Mispillion River	DE 210-004	208351	Bowman Branch at Rd. 634	0.9	15	4.3	5	--	--	--	--	--	--
		208361	Lednum Branch at Rd. 443	0.4	16	11.2	5	--	--	--	--	--	--
	DE 210-005	208221	Tub Mill Branch, Rd. 404	0.3	16	10.3	5	--	--	--	--	--	--
		208281	Kings Causeway Branch at Rd. 123	3.5	16	2.8	5	--	--	--	--	--	--
		208291	Fishing Branch at Rd. 124	2.0	16	5.0	5	--	--	--	--	--	--
		208301	Swan Creek at downstream side of Rt. 113	1.6	24	4.7	5	--	--	--	--	--	--
		208331	Mullet Run at Rt. 14	1.0	16	3.7	5	--	--	--	--	--	--
	DE 210-L01	208311	Middle of Tub Mill Pond	0.4	16	7.6	5	--	--	--	--	--	--
		208211	Rt. 36 Silver Lake	0.9	31	5.1	5	--	--	--	--	--	--
		208321	Middle of Silver Lake	0.9	16	4.9	5	--	--	--	--	--	--
	DE 210-L03	208011	Haven Lake at Rt. 113	1.0	31	5.1	5	--	--	--	--	--	--
		208341	Middle of Haven lake	1.0	16	4.9	5	--	--	--	--	--	--
	DE 210-L04	208381	Middle of Griffith Lake	1.0	16	5.4	5	--	--	--	--	--	--
	DE 210-L05	208191	Blairs Pond off Rd. 443	1.0	31	5.3	5	--	--	--	--	--	--
		208231	Beaverdam Branch, Rd. 384	0.9	31	4.9	5	--	--	--	--	--	--
		208391	Middle of Blairs Pond at Rd. 443	1.0	16	5.4	5	--	--	--	--	--	--
	DE 210-L06	208181	Abbotts Pond at Rd. 620	1.0	31	4.2	5	--	--	--	--	--	--
		208401	Middle of Abbotts Pond	1.0	16	4.2	5	--	--	--	--	--	--
Murderkill River	DE 220-001	206091	US Rt. 113 at Frederica By-Pass	3.0	36	4.5	5	--	--	--	--	--	--
		206101	Bowers Beach Wharf	20.6	35	1.9	5	--	--	--	--	--	--
		206131	1.25 miles from the mouth at Webs Landing	18.6	36	1.9	5	--	--	--	--	--	--
		206141	3.25 miles from the mouth	11.1	36	3.1	5	--	--	--	--	--	--
		206231	Confluence of Kent County STP trib.	5.0	36	4.1	5	--	--	--	--	--	--
		206711	Murderkill River near power lines (4.45 river mile	10.7	9	ID	3	--	--	--	--	--	--
	DE 220-002	206081	Spring Creek at Rt. 12 Bridge	2.6	36	4.5	5	--	--	--	--	--	--
		206561	Double Run at Rd. 371	0.4	38	5.6	5	--	--	--	--	--	--
		206641	Spring Creek, Pratt Branch at Canterbury Rd.	0.3	6	ID	3	--	--	--	--	--	--
	DE 220-004	206041	Browns Branch at Rt. 14 Bridge	0.3	38	8.0	5	--	--	--	--	--	--
		206051	Browns Branch at Rd. 384 Bridge	0.5	38	6.6	5	--	--	--	--	--	--
	DE 220-005	206011	US Rt. 13 Bridge below Felton	0.7	38	4.6	5	--	--	--	--	--	--

Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	Total N Category	DIP Growing Season Ave	DIP Category	DIN Growing Season Average	DIN Category	ERES Total Nitrogen Support	ERES Total Phosphorus Support
	DE 220-L01	206461	Hudson Branch, McGinnis Pond, Rd. 378	0.5	38	5.3	5	--	--	--	--	--	--
	DE 220-L02	206071	Andrews Lake at Rd. 380 Bridge	0.3	38	5.1	5	--	--	--	--	--	--
	DE 220-L03	206451	Coursey Pond at Rd. 388 Bridge	0.7	38	4.4	5	--	--	--	--	--	--
	DE 220-L05	206361	McCauley Pond near spillway	0.3	38	5.4	5	--	--	--	--	--	--
Naamans Creek	DE 230-001-02	101021	Naamans Road	0.2	36	2.1	5	--	--	--	--	--	--
		101031	South Branch at Darley Rd.	0.2	36	2.2	5	--	--	--	--	--	--
		101041	Rt. 13A	0.2	33	2.1	5	--	--	--	--	--	--
		101051	South Branch at Glenrock Rd.	0.1	7	ID	3	--	--	--	--	--	--
		101061	South Branch at Marsh Rd.	0.1	7	ID	3	--	--	--	--	--	--
		101071	South Branch at Decatur Rd.	0.1	8	ID	3	--	--	--	--	--	--
Nanticoke River	DE 240-001	304011	Sharptown, Maryland Rt 313	0.8	31	5.1	5	--	--	--	--	--	--
		304041	Middleford Bridge	0.9	31	4.6	5	--	--	--	--	fails	meets
		304071	Buoy 45 (State Line)	0.8	31	4.8	5	--	--	--	--	fails	meets
		304091	Buoy 51 (Conf. Broad Creek)	0.8	31	4.9	5	--	--	--	--	--	--
		304151	Buoy 66 (Conf DuPont Gut)	0.9	31	4.6	5	--	--	--	--	fails	meets
		304461	Seaford STP Discharge	0.9	31	4.3	5	--	--	--	--	fails	meets
		304471	Rt. 13 Bridge	0.8	30	4.9	5	--	--	--	--	fails	meets
	DE 240-002	304191	Rd. 545 Mainstem Nanticoke	0.9	57	5.7	5	--	--	--	--	meets	meets
		304291	Rd. 600 Bridge	0.9	31	6.0	5	--	--	--	--	fails	meets
	DE 240-003	304381	Bucks Branch at Rd. 546	0.8	30	10.4	5	--	--	--	--	--	--
	DE 240-005	316011	Gravelly Branch at Rd. 525 Bridge	0.9	35	2.8	5	--	--	--	--	fails	meets
	DE 240-L02	304311	Concord Pond overflow	0.9	31	3.0	5	--	--	--	--	fails	meets
	DE 240-L04	304321	Williams Pond, below the pond at Rd. 535	0.8	31	6.3	5	--	--	--	--	fails	meets
Pocomoke River	DE 250-001	313011	Rd. 419 Bridge	0.9	28	3.5	5	--	--	--	--	--	--
Red Clay Creek	DE 260-001	103011	Stanton, Rt. 4 at Stanton Bridge (USGS gage 01480015)	0.2	32	3.9	5	--	--	--	--	--	--
		103031	Wooddale, Rt. 48 (USGS gage 01480000)	0.2	31	4.1	5	--	--	--	--	--	--
		103041	Ashland, Rd. 258a	0.2	32	4.8	5	--	--	--	--	--	--
	DE 260-002	103061	Burrough's Run at Creek Rd. (Rt. 82)	0.3	33	2.6	5	--	--	--	--	meets	meets
Red Lion Creek	DE 270-001-01	107031	Rt. 9 Bridge	0.2	31	2.1	5	--	--	--	--	--	--
		107061	Unnamed tributary at Rd. 405	0.5	15	4.7	5	--	--	--	--	--	--
		107011	Rt. 7	0.6	32	1.3	5	--	--	--	--	--	--

Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	**Total N Category**	DIP Growing Season Ave	**DIP Category**	DIN Growing Season Average	**DIN Category**	**ERES Total Nitrogen Support**	**ERES Total Phosphorus Support**
Red Lion Creek	DE 270-001-02	107041	De Rt 71 Between De Rt 7 And US Rt 13	0.5	15	2.9	5	--	--	--	--	--	--
		107071	Doll Run at Rd. 405	0.2	15	3.9	5	--	--	--	--	--	--
Rehoboth Bay	DE 280-001-01	308051	Guinea Creek at Rt. 298 Bridge	7.8	32	4.0	5	0.013	5	2.123	5	meets	meets
	DE 280-002	308291	Love Creek, Rd. 277	0.9	32	2.9	5	0.006	1	1.382	5	meets	meets
		308371	Bundick's Branch at Rt. 23	0.9	31	5.0	5	0.013	5	3.646	5	--	--
	DE 280-E01	306071	Buoy 3, Rehoboth Bay	27.6	31	0.9	1	0.019	5	0.157	5	meets	meets
		306091	Buoy 7, Rehoboth Bay	28.4	31	0.7	1	0.016	5	0.165	5	meets	meets
		306111	Massey's Ditch at Bouy 17	29.2	31	0.7	1	0.024	5	0.199	5	meets	meets
	DE 280-L01	308031	Burton Pond, Rd. 24	0.9	32	2.2	5	0.005	1	0.954	5	meets	meets
Saint Jones River	DE 290-001-01	205011	at Bowers Beach,Mouth Of Del.Bay	18.2	9	ID	3	--	--	--	--	--	--
		205031	2.2 Miles From Mouth	12.4	9	ID	3	--	--	--	--	--	--
		205041	3.5 miles from mouth at Barkers Landing	11.7	32	2.6	5	--	--	--	--	--	--
		205061	4.58 miles from mouth; at Gravel Pit	4.9	9	ID	3	--	--	--	--	--	--
	DE 290-001-02	205091	Rt. 10 Bridge near DAFB	4.0	32	3.3	5	--	--	--	--	--	--
		205131	Route 13 Near Dover	1.6	9	ID	3	--	--	--	--	--	--
		205571	Division Street (Dover)	0.7	32	2.0	5	--	--	--	--	--	--
	DE 290-002	205241	Rt. 13 North Moores Lake, Issacs Branch	0.4	32	6.2	5	--	--	--	--	--	--
		205321	Moores Lake, Issacs Branch at Road 203	0.9	9	ID	3	--	--	--	--	--	--
		205601	Wyoming Pond outfall at Rt. 15	0.6	9	ID	3	--	--	--	--	--	--
	DE 290-003	205151	Rd. 69 State College, Fork Branch	0.7	31	1.9	5	--	--	--	--	--	--
		205171	Fork Br at Rd 156, Nr Reichhold	0.9	9	ID	3	--	--	--	--	--	--
		205271	Silver Lake, Fork Branch at Road 167	0.8	9	ID	3	--	--	--	--	--	--
	DE 290-004	205261	Derby Pd, Tidbury Creek at Road 125	0.4	9	ID	3	--	--	--	--	--	--
		205581	Tidbury Creek at Rd. 105	0.9	9	ID	3	--	--	--	--	--	--
		205591	Voshell Pond outfall at Rd. 360	0.8	9	ID	3	--	--	--	--	--	--
	DE 290-L01	205181	Rt. 13 Alt. Moores Lake	0.5	32	5.6	5	--	--	--	--	--	--
	DE 290-L02	205191	Silver Lake Spillway, Dover City Park	0.7	32	1.9	5	--	--	--	--	--	--
		205201	Silver Lake at State St., Dover	0.9	9	ID	3	--	--	--	--	--	--

Table III-1 Delaware 2008 305(b)/303(d) IR Station Summary Statistics

Watershed	Segment	Station	Location Description	Avg. Salinity	Total Nitrogen Samples	LCL 90th Percentile Total N	**Total N Category**	DIP Growing Season Ave	**DIP Category**	DIN Growing Season Average	**DIN Category**	**ERES Total Nitrogen Support**	**ERES Total Phosphorus Support**
	DE 290-L03	205211	Derby Pond at Rt. 13A	0.5	32	4.5	5	--	--	--	--	--	--
Shellpot Creek	DE 300-001-01	102041	Cherry Island at Rd. 501 Bridge	0.4	30	2.9	5	--	--	--	--	--	--
	DE 300-001-02	102011	US Rt. 13 Bridge (Gov Printz Blvd)	0.3	30	2.1	5	--	--	--	--	--	--
	DE 300-001-03	102101	Stoney Creek @ Rt. 13	0.3	17	2.6	5	--	--	--	--	--	--
Smyrna River	DE 310-001	201011	Lake Como at US Route 13 Bridge	0.9	16	3.4	5	--	--	--	--	--	--
		201031	Mill Creek at DE Route 6 Bridge	1.5	16	2.6	5	--	--	--	--	--	--
		201041	Rt. 9 Fleming's Landing	5.0	32	2.3	5	--	--	--	--	--	--
		201101	2.07 Miles From Mouth at Shorts Landing	4.8	9	ID	3	--	--	--	--	--	--
	DE 310-002	201021	Rd. 137 Bridge, Mill Creek	0.6	32	3.3	5	--	--	--	--	--	--
		201151	Mill Creek at Rt. 300	0.5	16	4.8	5	--	--	--	--	--	--
	DE 310-003	201051	Rd. 485 Bridge at Smyrna Landing	1.2	32	3.0	5	--	--	--	--	--	--
		201161	Rd. 38 Bridge, Providence Creek	0.3	32	3.5	5	--	--	--	--	--	--
		201171	Sawmill Branch at Rd. 30	1.9	16	2.2	5	--	--	--	--	--	--
		201181	Downstream of Duck Creek Pond at Rd. 486	0.5	16	3.5	5	--	--	--	--	--	--
		201201	Green Spring Branch at Rd. 47	1.0	17	4.7	5	--	--	--	--	--	--
		201211	Paw Paw Branch at Rd. 483	1.0	16	3.3	5	--	--	--	--	--	--
		201221	Providence Creek at Rd. 483	0.8	16	3.2	5	--	--	--	--	--	--
	DE 310-L01	201141	Lake Como boat ramp	1.0	16	3.3	5	--	--	--	--	--	--
		201191	Middle of Duck Creek Pond	0.3	16	3.6	5	--	--	--	--	--	--
White Clay Creek	DE 320-001	105011	Stanton, Old Rt. 7 Bridge	0.2	30	4.4	5	--	--	--	--	--	--
		105031	Chambers Rock Rd. (Road 329) near Thompson	0.2	32	5.5	5	--	--	--	--	meets	meets
		105151	DE Park Race Track (USGS gage 01479000), 35ft downstream	0.2	32	4.3	5	--	--	--	--	--	--
		105171	McKee Lane in Newark	0.1	31	4.7	5	--	--	--	--	--	--
	DE 320-002	105071	Mill Creek, Above Rt. 4 (DE Park)	0.2	31	3.3	5	--	--	--	--	--	--
	DE 320-003	105101	Pike Creek Confluence, Upper Pike Creek Rd. (Rd. 322)	0.3	32	3.4	5	--	--	--	--	--	--
		105181	Pike Creek at Paper Mill Road	0.4	25	4.2	5	--	--	--	--	--	--
	DE 320-004	105131	Middle Run Confluence, Possum Park Rd. (Rd. 303)	0.8	32	2.5	5	--	--	--	--	--	--

Watershed	SegmentID	Segment Description	Use Support Category			
			Dissolved Oxygen	Enterococcus	Nitrogen (total or DIN)	Phosphorus (Total or DIP)
Appoquinimink River	DE 010-001-01	Lower Appoquinimink River	5	1	5	5
Appoquinimink River	DE 010-001-02	Upper Appoquinimink River	5	5	5	5
Appoquinimink River	DE 010-001-03	Drawyer Creek	1	1	5	5
Appoquinimink River	DE 010-L01	Noxontown Pond	1	1	5	1
Appoquinimink River	DE 010-L02	Silver Lake	1	1	5	1
Appoquinimink River	DE 010-L03	Shallcross Lake	1	1	5	1
Army Creek	DE 020-001	Lower Army Creek	5	5	5	5
Army Creek	DE 020-002	Upper Army Creek	5	5	5	5
Army Creek	DE 020-003	Tributary to Army Creek	1	5	5	1
Blackbird Creek	DE 030-001	Lower Blackbird	5	5	5	5
Blackbird Creek	DE 030-002	Upper Blackbird	1	5	5	1
Blackbird Creek	DE 030-003	Tributaries on the mainstem	5	5	5	5
Brandywine Creek	DE 040-001	Lower Brandywine	1	5	5	5
Brandywine Creek	DE 040-002	Upper Brandywine	1	5	5	5
Broad Creek	DE 050-006-03	Raccoon Prong	5	5	5	5
Broad Creek	DE 050-L03	Horseys Pond	1	1	5	5
Broad Creek	DE 050-L04	Records Pond	1	1	5	1
Broadkill River	DE 060-001	Lower Broadkill	5	5	5	5
Broadkill River	DE 060-002	Beaverdam Creek	1	5	5	5
Broadkill River	DE 060-003	Upper Broadkill River	1	1	5	1
Broadkill River	DE 060-004	Round Pole Branch	5	5	5	5
Broadkill River	DE 060-005	Ingrams Branch	5	5	5	5
Broadkill River	DE 060-006	Pemberton Branch	1	5	5	1
Broadkill River	DE 060-007-01	Lower Red Mill Branch	1	1	5	5
Broadkill River	DE 060-007-02	Martin Branch	3	3	3	3
Broadkill River	DE 060-008	Ingram Branch	5	1	5	5
Broadkill River	DE 060-L01	Red Mill Pond	1	1	5	5

Table III-2 Delaware 2008 305(b)/303(d) Segment Use Attainment Summaries

Broadkill River	DE 060-L02	Waggamons Pond	1	1	5	1
Broadkill River	DE 060-L03	Waples Pond and Reynolds Pond	1	1	5	1
Buntings Branch	DE 070-001	Buntings Branch	1	5	5	5
Cedar Creek	DE 080-001	Lower Cedar Creek	5	5	5	5
Cedar Creek	DE 080-002	Upper Cedar Creek	5	5	5	1
Cedar Creek	DE 080-003	Slaughter Creek	5	5	5	5
Canal	DE 090-001	C&D Canal	1	1	5	5
Canal	DE 090-L01	Lums Pond	1	1	5	1
Chesapeake Drainage System	DE 100-002	Sewell Branch, including tributaries	5	5	5	5
Chesapeake Drainage System	DE 100-003	Gravelly Run, including tributaries	1	5	5	5
Choptank	DE 110-001	Tappahanna Ditch	1	5	5	5
Choptank	DE 110-002	Culbreth Marsh Ditch	1	5	5	5
Choptank	DE 110-003	Cow Marsh Creek	1	5	5	1
Christina River	DE 120-001	Lower Christina River	1	5	5	5
Christina River	DE 120-002	Mid Christina River	5	5	5	5
Christina River	DE 120-003	Upper Christina River	1	5	5	1
Christina River	DE 120-004-01	Lower Christina Creek	1	5	5	1
Christina River	DE 120-006	Upper Christina Creek	1	5	5	1
Christina River	DE 120-007-01	Little Mill Creek and Willow Run	1	5	5	5
Dragon Run Creek	DE 130-001	Lower Dragon Run Creek	5	5	5	5
Dragon Run Creek	DE 130-002	Upper Dragon Run Creek	5	5	5	1
Indian River	DE 140-001	White Creek	1	1	5	5
Indian River	DE 140-002	Blackwater Creek	5	5	5	5
Indian River	DE 140-003	Pepper Creek, including tributaries	5	5	5	5
Indian River	DE 140-004	Indian River	5	5	5	5
Indian River	DE 140-005	Swan Creek	1	5	5	1
Indian River	DE 140-006	Stockley Branch	1	1	5	1
Indian River	DE 140-E01	Lower Indian River Bay	1	1	5	5
Indian River	DE 140-E02	Upper Indian River Bay	5	1	5	5
Indian River	DE 140-L01	Millsboro Pond	1	1	5	1

Table III-2 Delaware 2008 305(b)/303(d) Segment Use Attainment Summaries

Iron Branch	DE 150-001	Iron Branch	1	5	5	5
Leipsic River	DE 160-001	Lower Leipsic River	5	5	5	5
Leipsic River	DE 160-002	Upper Leipsic River	5	5	5	5
Leipsic River	DE 160-003	Tributary from the dam at Garrisons Lake to mouth at Delaware Bay	5	5	5	5
Leipsic River	DE 160-004	Muddy Branch	5	5	5	5
Leipsic River	DE 160-L01	Garrisons Lake	5	1	5	5
Leipsic River	DE 160-L02	Masseys Mill Pond	5	5	5	5
Lewes and Rehoboth Canal	DE 170-001	Lewes and Rehoboth Canal	5	5	5	5
Little Assawoman Bay	DE 180-001	Little Assawoman Canal	5	5	5	1
Little Assawoman Bay	DE 180-002	Miller Creek	5	5	5	5
Little Assawoman Bay	DE 180-003	Dirickson Creek	5	5	5	5
Little Assawoman Bay	DE 180-E01	Little Assawoman Bay	1	1	5	1
Little River	DE 190-001-01	Lower Little River	5	5	5	5
Little River	DE 190-001-02	Upper Little River	5	5	5	5
Little River	DE 190-001-03	Pipe Elm Branch	5	5	5	5
Marshyhope Creek	DE 200-001	Marshyhope Creek	1	1	5	1
Mispillion River	DE 210-001	Lower Mispillion	5	5	5	5
Mispillion River	DE 210-002	Upper Mispillion	1	5	5	1
Mispillion River	DE 210-003	tributaries	1	5	5	5
Mispillion River	DE 210-004	Silver Lake	1	5	5	5
Mispillion River	DE 210-005	Mispillion Tributaries From Dam At Silver Lake To The Mouth	5	5	5	5
Mispillion River	DE 210-L01	Tub Mill Pond	1	1	5	5
Mispillion River	DE 210-L02	Silver Lake	1	1	5	1
Mispillion River	DE 210-L03	Haven Lake	1	1	5	1
Mispillion River	DE 210-L04	Griffith Lake	1	1	5	1
Mispillion River	DE 210-L05	Blairs Pond	1	5	5	5
Mispillion River	DE 210-L06	Abbotts Mill Pond	5	1	5	5
Murderkill River	DE 220-001	Lower Murderkill	5	5	5	5

Table III-2 Delaware 2008 305(b)/303(d) Segment Use Attainment Summaries

Murderkill River	DE 220-002	Spring Creek	5	5	5	5
Murderkill River	DE 220-004	Browns Branch	1	5	5	1
Murderkill River	DE 220-005	Upper Murderkill River	1	5	5	5
Murderkill River	DE 220-L01	McGinnis Pond	1	1	5	1
Murderkill River	DE 220-L02	Andrews Lake	1	1	5	1
Murderkill River	DE 220-L03	Coursey Pond	1	1	5	5
Murderkill River	DE 220-L05	McCauley Pond	1	1	5	1
Naamans Creek	DE 230-001-02	North Branch and South Branch	5	5	5	1
Nanticoke River	DE 240-001	Lower Nanticoke River (Chesapeake Bay Program Segment NANTF)	5	1	5	1
Nanticoke River	DE 240-002	Upper Nanticoke River	1	1	5	1
Nanticoke River	DE 240-003	Clear Brook Branch	1	1	5	5
Nanticoke River	DE 240-005	Gravelly Branch	1	1	5	1
Nanticoke River	DE 240-L02	Concord Pond	1	1	5	1
Nanticoke River	DE 240-L04	Williams Pond	1	1	5	5
Pocomoke River	DE 250-001	Pocomoke River	1	5	5	5
Red Clay Creek	DE 260-001	Mainstem	1	5	5	5
Red Clay Creek	DE 260-002	Burroughs Run	1	5	5	1
Red Lion Creek	DE 270-001-01	Lower Red Lion	5	5	5	5
Red Lion Creek	DE 270-001-02	Upper Red Lion	1	5	5	1
Rehoboth Bay	DE 280-001-01	Chapel Branch	1	5	5	1
Rehoboth Bay	DE 280-002	Love Creek, including tributaries	1	5	5	1
Rehoboth Bay	DE 280-E01	Rehoboth Bay	1	1	5	5
Rehoboth Bay	DE 280-L01	Burton Pond	1	1	5	1
Saint Jones River	DE 290-001-01	Lower Saint Jones	5	5	5	5
Saint Jones River	DE 290-001-02	Upper Saint Jones	5	5	5	5
Saint Jones River	DE 290-002	Isaac Branch	1	5	5	1
Saint Jones River	DE 290-003	Fork Branch	5	5	5	5
Saint Jones River	DE 290-004	Tidbury Branch	3	3	3	3
Saint Jones River	DE 290-L01	Moores Lake	1	1	5	1

Saint Jones River	DE 290-L02	Silver Lake	1	1	5	5
Saint Jones River	DE 290-L03	Derby Pond	1	1	5	1
Shellpot Creek	DE 300-001-01	Lower Shellpot Creek	5	5	5	5
Shellpot Creek	DE 300-001-02	Upper Shellpot Creek	1	5	5	1
Smyrna River	DE 310-001	Lower Smyrna River	5	5	5	5
Smyrna River	DE 310-002	Mill Creek	1	5	5	5
Smyrna River	DE 310-003	Tributary of Smyrna River	5	5	5	5
Smyrna River	DE 310-L01	Lake Como and Duck Creek Pond	5	5	5	5
White Clay Creek	DE 320-001	Mainstem	1	5	5	5
White Clay Creek	DE 320-002	Mill Creek	1	5	5	1
White Clay Creek	DE 320-003	Pike Creek	1	5	5	1
White Clay Creek	DE 320-004	Middle Run	1	5	5	1

Summary Data Tables

The following summary tables (Table III-3- III-6) summarize 2008 Use Support determinations in Table III-2.

Individual Use Support Summaries

(National and State Uses)

Individual Use Support Summary for DE

Table III-3

Report for Water Type: RIVER; Units: MILES

USE	Size Assessed	Size Fully Supporting	Size Not Supporting
Fish, Aquatic Life, and Wildlife	2,478.17	70.8	2,407.37
Primary Contact Recreation	2,479.38	288.6	2,190.78
Waters of Exceptional Recreational or Ecological Significance	867.25	190	677.25

Type of Waterbody: Freshwater Lake
Note: All numbers are in Acres

Table III-4 Report for Water Type: FRESHWATER LAKE; Units: ACRES

USE	Size Assessed	Size Fully Supporting	Size Not Supporting
Fish, Aquatic Life, and Wildlife	2,953.9	334	2,619.9
Primary Contact Recreation	2,953.9	1,642.7	1,311.2
Waters of Exceptional Recreational or Ecological Significance	757.8	256.7	501.1

Table III-5

Report for Water Type: ESTUARY; Units: SQUARE MILES

USE	Size Assessed	Size Fully Supporting	Size Not Supporting
Fish, Aquatic Life, and Wildlife	28.95	0	28.95
Primary Contact Recreation	29.54	15	14.54
Waters of Exceptional Recreational or Ecological Significance	29.54	3	26.54

Table III-6

Type of Waterbody: Coastal Waters
Note: All numbers are in Miles

Use	Size Assessed	Size Fully Supporting	Size Not Supporting
Aquatic Life Support	25	25	0
Primary Contact (Recr)	25	25	0

FINAL DETERMINATION FOR THE STATE OF DELAWARE 2008 CLEAN WATER ACT SECTION 303(d) LIST OF WATERS NEEDING TMDLs

WATERBODY ID	WATERSHED NAME	SEGMENT	Overall CALM Code	DESCRIPTION	SIZE	POLLUTANT OR STRESSOR	PROBABLE SOURCE(S)	YEAR LISTED	TARGET DATE FOR TMDL	TMDL DATE	Polllutant CALM Code	Year Changed from Category 5 Per 305(b) Assessment and Methodology	Notes
Piedmont Basin													
DE230-001-01	Naamans Creek	Lower Naamans Creek	4a	From the mouth at the Delaware River, upstream to the first railroad bridge	0.30 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	2002	2004	2005	4a	2006	
DE230-001-02	Naamans Creek	North Branch and South Branch	5	Upper Naamans Creek, including all tributaries on the North Branch and	7.8 miles	Nutrients	NPS	1996	2004	2005	4a	2006	
						Bacteria	NPS	1996	2004	2005	4a	2006	
				First tributary after the headwaters of South Naamans Creek to the mainstem	1.15 miles	Biology and Habitat	NPS	1998	2009		5		
				From the confluence of Naamans Creek and West Branch Naamans Creek to the confluence of Naamans Creek and North Branch Naamans Creek	0.56 miles	Biology and Habitat	NPS	1998	2009		5		
DE300-001-01	Shellpot Creek	Lower Shellpot Creek	5	From the head of tide below the east set of railroad tracks to the mouth of the Delaware River	1.0 mile	Nutrients	NPS Del. River	1996	2004	2005	4a	2006	
						DO		1996	2004	2005	4a	2006	
						Bacteria		2002	2004	2005	4a	2006	
						PCBs		2002	2009		5		
						Chlordane		2002	2009		5		
DE300-001-02	Shellpot Creek	Upper Shellpot Creek	5	From the headwaters to the head of tide below the east set of railroad tracks	7.7 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	1996	2004	2005	4a	2006	
				Western tributary of the headwaters to the confluence of the next larger stream order	1.4 miles	Biology and Habitat	NPS	1998	2009		5		
				From the headwaters of Matson Run to the confluence with mainstem Shellpot Creek	1.3 miles	Biology and Habitat	NPS	1998	2009		5		
DE300-001-03	Shellpot Creek	All other tributaries located in the watershed but NOT on the mainstem	5	Western tributary of the headwaters of Stoney Creek to the confluence with mainstem Stoney Creek	0.63 miles	Habitat	NPS	1998	2009		5		
				From the confluence of the headwaters of Stoney Creek to the mouth of the Delaware River	1.2 miles	Biology and Habitat	NPS	1998	2009		5		
						Nutrients	NPS	2008	2005		5		
DE040-001	Brandywine Creek	Lower Brandywine	5	Mainstem Lower Brandywine	3.8 miles	Nutrients	PS, NPS, SF	1996		2000	4a	2004	
						PCBs		1996	2009		5		
						Bacteria		2002	2004	2005	4a	2006	
						Habitat	NPS	1998	2009		5		

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DE040-002	Brandywine Creek	Upper Brandywine	5	From State Line to Wilmington	9.3 miles	Bacteria	PS, NPS, SF	1996	2004	2005	4a		Bacteria, listed in 1996, delisted 2006 , relisted 2008
						Nutrients		1996		2000	4a		
						PCBs		1996	2009		5		
						Dioxin		2002	2009		5		
				From State line to the confluence with the Christina River	8.0 miles	Habitat	NPS	1998	2009		5		
DE040-003	Brandywine Creek	All tributaries on Brandywine Creek from the headwaters at PA-DE line to the confluence with the Christina River	5	Eastern tributary of Beaver Creek, from headwaters to the confluence with mainstem Beaver Creek	0.96 miles	Biology and Habitat	NPS	1998	2009		5		
				Tributary originating in Pennsylvania on the western side of Brandywine Creek	0.26 miles	Biology and Habitat	NPS	1998	2009		5		
				Tributary of Brandywine Creek, off Route 100 (near PA-DE border)	0.92 miles	Habitat	NPS	1998	2009		5		
				Tributary of Brandywine Creek just below Beaver Creek	0.85 miles	Habitat	NPS	1998	2009		5		
				Eastern tributary of the headwaters of Rocky Run(upper half)	1.16 miles	Habitat	NPS	1998	2009		5		
				Eastern tributary of the headwaters of Rocky Run(lower half)	1.16 miles	Biology and Habitat	NPS	1998	2009		5		
				From the confluence of the headwaters of Wilson Run to the next larger stream order (lower half)	0.64 miles	Habitat	NPS	1998	2009		5		
				From the confluence of the headwaters of Wilson Run to the next larger stream order (upper half)	0.64 miles	Biology and Habitat	NPS	1998	2009		5		
				Wilson Run, from start of the third order stream to the confluence with Brandywine Creek	0.88 miles	Biology	NPS	1998	2009		5		
				Tributary of Wilson Run on Montchanin Road from the headwaters to the first confluence	0.45 miles	Habitat	NPS	1998	2009		5		

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DE260-001	Red Clay Creek	Mainstem	5	From PA-DE line to the confluence with White Clay Creek	12.8 miles	Bacteria	PS, NPS, SF	1996	2004	2005	4a	2006	
						Nutrients		1996		2000	4a	2004	
						Zn		1996		1999	4a	2004	
						PCBs		1996	2009		5		
						Dioxin		2002	2009		5		
						Chlorinated Pesticides		2002	2009		5		
				From the confluence of West Branch Red Clay Creek to the confluence with White Clay Creek (lower half)	6.4 miles	Habitat	NPS	1998	2009		5		
				From the confluence of West Branch Red Clay Creek to the confluence with White Clay Creek (upper half)	6.4 miles	Biology and Habitat	NPS	1998	2009		5		
DE260-002	Red Clay Creek	Burroughs Run	5	From PA-DE line to the confluence with Red Clay Creek	2.6 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
					2.6 miles	Nutrients	NPS	1996		2000	4a	2004	
				From the confluence of the headwaters of Burroughs Run to the confluence with Red clay Creek	4.21 miles	Biology	NPS	1998	2009		5		
DE260-003	Red Clay Creek	All other tributaries located in the watershed but NOT on the mainstem	5	Second tributary below Burroughs Run to the confluence with Red Clay Creek	1.4 miles	Habitat	NPS	1998	2009		5		
				Western tributary of the headwaters of Hyde Run to the confluence with the next larger stream order	1.2	Biology and Habitat	NPS	1998	2009		5		
DE260-L01	Red Clay Creek	Reservoir	3	Hoopes Reservoir	200.0 acres	Bacteria	PS, NPS	1996			3	2004	This segment was listed in 1996, apparently based on earlier reports but no data were used for the listing. No data has been collected in the interim. The Department will study the segment to determine if a listing is appropriate.

WATERBODY ID	WATERSHED NAME	SEGMENT	Overall CALM Code	DESCRIPTION	SIZE	POLLUTANT OR STRESSOR	PROBABLE SOURCE(S)	YEAR LISTED	TARGET DATE FOR TMDL	TMDL DATE	Pollutant CALM Code	Year Changed from Category 5 Per 305(b) Assessment and Methodology	Notes
DE320-001	White Clay Creek	Mainstem	5	From the PA-DE line to the confluence with the Christina River	15.6 miles	Bacteria	PS, NPS	1996	2004	2005	4a	2006	
						Nutrients	PS, NPS	1996		2000	4a	2004	
						Zn (below Paper Mill Road)	PS, NPS	1996		1999	1	2004	Zinc, listed in 1999 delisted 2004 based on improved water quality
						PCBs	PS, NPS	1996 , 2006	2009		5		Advisory updated in 2006 to entire White Clay Creek from PA line to River Mouth
				From the confluence of East Branch White Clay Creek and West Branch White Clay Creek to the confluence with the Christina River	16.2 miles	Biology and Habitat	NPS	1998	2009		5		
DE320-002	White Clay Creek	Mill Creek	5	From the headwaters to the confluence with White Clay Creek	8.3 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	1996		2000	4a	2004	
				From the confluence of the headwaters of Mill Creek to the confluence with the next larger stream order	0.27 miles	Biology and Habitat	NPS	1998	2009		5		
				Second western tributary-- From the headwaters of mainstem Mill Creek	0.04 miles	Habitat	NPS	1998	2009		5		
				From the confluence of the headwaters of Mill Creek to the confluence with White Clay Creek (upper half)	1.64 miles	Habitat	NPS	1998	2009		5		
				From the confluence of the headwaters of Mill Creek to the confluence with White Clay Creek (lower half)	1.64 miles	Biology and Habitat	NPS	1998	2009		5		

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DE320-003	White Clay Creek	Pike Creek	5	From the headwaters to the confluence with White Clay Creek	5.4 miles	Nutrients	NPS	1996		2000	4a	2004	
						Bacteria	NPS	1996	2004	2005	4a	2006	
				Third eastern tributary after the headwaters of Pike Creek (upper half)	0.21 miles	Biology	NPS	1998	2009		5		
				Third eastern tributary after the headwaters of Pike Creek (lower half)	0.21 miles	Biology and Habitat	NPS	1998	2009		5		
				Second eastern tributary after the headwaters of Pike Creek	0.96 miles	Biology and Habitat	NPS	1998	2009		5		
				From the confluence of the headwaters of Pike Creek to the confluence with White Clay Creek	4.7 miles	Biology and Habitat	NPS	1998	2009		5		
DE320-004	White Clay Creek	Middle Run	5	From the headwaters to the confluence with White Clay Creek	4.5 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	1996		2000	4a	2004	
				Eastern tributary of the headwaters of Middle Run to the confluence of the next larger stream order (upper half)	0.89 miles	Biology	NPS	1998	2009		5		
				Eastern tributary of the headwaters of Middle Run to the confluence of the next larger stream order (lower half)	0.89 miles	Biology and Habitat	NPS	1998	2009		5		
				Western tributary of the headwaters of Middle Run to the confluence with the mainstem	1.3 miles	Habitat	NPS	1998	2009		5		
DE320-005	White Clay Creek	All tributaries from the headwaters to the confluence with the Christina River	5	First tributary after State line to the confluence of White Clay Creek, along Thompson Station Road	1.1 miles	Habitat	NPS	1998	2009		5		
				Tributary off The Hunt at Louviers	0.38 miles	Biology	NPS	1998	2009		5		
				Tributary off White Clay Creek that parallels Paper Mill Road-- Jennys Run	0.38 miles	Biology	NPS	1998	2009		5		
				First tributary after Pike Creek--from the headwaters to the confluence with White Clay Creek	1.1 miles	Habitat	NPS	1998	2009		5		

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DE120-001	Christina River	Lower Christina River	5	Mainstem Lower Christina River	1.5 miles	Nutrients	NPS, SF	1996		2001	4a	2004	
						DO	NPS, SF	1996			1	2002	DO, listed in 1996, delisted 2002
						PCBs	NPS, SF	1996	2009		5		
						Bacteria	PS,NPS	2002	2004	2005	4a	2006	
						Dieldrin	PS, NPS	2002	2009		5		
DE120-002	Christina River	Mid Christina River	5	Between White Clay Creek and Brandywine River	7.5 miles	Nutrients	NPS	1996		2001	4a	2004	
						PCBs	SF	1996	2009		5		
						Bacteria	PS, NPS	2002	2004	2005	4a	2006	
						Dieldrin	NPS	2002	2009		5		
						DO	NPS	2008		2001	5		
DE120-003	Christina River	Upper Christina River	5	Mainstem Upper Christina River	6.3 miles	Nutrients	NPS, PS	1996		2001	4a	2004	
						PCBs	NPS, PS	1996	2009		5		
						Bacteria	NPS, PS	1996	2004	2005	4a	2006	
						DO	NPS, PS	2004		2001	1	2006	DO, listed in 2004, delisted 2006
						Chlordane	NPS, PS	2006	2013		5		
				Segments from Smalley's Pond overflow to the confluence with White Clay Creek	5.77 miles	Biology and Habitat	NPS	1998	2009		5		
				Tributary downstream of Smalleys Pond on the Christina River	0.65 miles	Biology	NPS	1998	2009		5		
DE120-003-02	Christina River	Lower Christina Creek	5	Tributary from Smalleys Pond overflow to White Clay Creek	1.0 mile	Biology and Habitat	NPS	1998	2009		5		
						Nutrients	NPS	2002		2001	4a	2004	
						DO	NPS	2002		2001	4a	2004	
						Bacteria	NPS	2002	2004	2005	4a	2006	

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DE120-004-01	Christina River	Lower Christina Creek	5	Mainstem Lower Christina Creek	8.4 miles	Bacteria	NPS,	1996	2004	2005	4a	2006	
						Nutrients	NPS	1996		2001	4a	2004	
						PCBs	NPS, SF	1996	2009		5		
						DO	NPS	2002		2001	1	2006	DO, listed in 2002, delisted 2006
						Dieldrin	NPS	2006	2013		5		
				From the confluence of West Branch Christina River to the confluence with the mainstem	6.0 miles	Biology and Habitat	NPS	1998	2009		5		
DE120-004-02	Christina River	Belltown Run	5	From the headwaters above Becks Pond to the confluence with the Christina River	3.8 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	2002	2004		4a	2006	
						DO	NPS	2002	2004		4a	2006	
				Eastern tributary of the headwaters of Belltown Run to the confluence with the Christina River	4.2 miles	Biology and Habitat	NPS	1998	2009		5		
				Western tributary of the headwaters of Belltown Run to its confluence	0.88 miles	Habitat	NPS	1998	2009		5		
DE120-004-03	Christina River	Muddy Run	5	From the headwaters above Sunset Pond to the confluence with Belltown Run below Becks Pond	8.0 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
				From the headwaters of Iron Hill Run to the next larger stream order	2.3 miles	Habitat	NPS	1998	2009		5		
				Eastern tributary of the headwaters of Iron Hill Run to the next larger stream order	0.71 miles	Habitat	NPS	1998	2009		5		
				Eastern tributary above Sunset Pond to the confluence of the next larger stream order	2.3 miles	Biology	NPS	1998	2009		5		
				Eastern tributary of the headwaters of Muddy Run to its confluence	0.63 miles	Habitat	NPS	1998	2009		5		
DE120-005-01	Christina River	West Branch	4a	West Branch including Persimmon Run and Stine Haskell Branch	5.3 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	1996		2001	4a	2004	

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DE120-006	Christina River	Upper Christina Creek	5	Mainstem Upper Christina Creek	8.3 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients		1996		2001	4a	2004	
				From the confluence of the headwaters of Upper Christina River to the confluence of West Branch	2.6 miles	Biology and Habitat		1998	2009		5		
				First western tributary after the headwaters of the Upper Christina River to mainstem Upper Christina River (upper half)	0.67 miles	Habitat		1998	2009		5		
				First western tributary after the headwaters of the Upper Christina River to mainstem Upper Christina River (lower half)	0.67 miles	Biology and Habitat		1998	2009		5		
DE120-007-01	Christina River	Little Mill Creek and Willow Run	5	From the confluence of Willow Run and Chestnut Run to the confluence with the Christina River	5.1 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	1996		2001	4a	2004	
						DO		1996			1	2002	DO, listed in 1996, delisted 2002
						PCBs	NPS	1996	2009		5		
				First western tributary after the headwaters of Little Mill Creek to the confluence with mainstem Little Mill Creek	1.4 miles	Habitat	NPS	1998	2009		5		
				From the headwaters of Willow Run to the confluence with the Christina River	0.54 miles	Habitat	NPS	1998	2009		5		
				From the confluence of the headwaters of Little Mill Creek to the confluence of Chestnut Run	4.4 miles	Biology and Habitat	NPS	1998	2009		5		
				Little Mill Creek--from the confluence of Chestnut Run to the confluence with the Christina River	3.4 miles	Biology and Habitat	NPS	1998	2009		5		
DE120-007-02	Christina River	Chestnut Run	5	From the headwaters of Chestnut Run to the confluence with the Christina River	2.8 miles	Bacteria	NPS	1996	2004	2005	4a	2006	
				Eastern tributary of the headwaters of Chestnut Run to the confluence of the next larger stream order	1.1 miles	Habitat	NPS	1998	2009		5		
				Left tributary of the headwaters of Chestnut Run to the confluence of the next larger stream order	0.43 miles	Biology and Habitat	NPS	1998	2009		5		

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DE120-L01	Christina River	Smalleys Pond	5	Smalleys Pond east of Newark	30.0 acres	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	1996	2004	2004	4a	2006	
						PCBs	NPS	1996	2009		5		
						DO	NPS	2004	2004		4a	2006	
DE120-L02	Christina River	Becks Pond	5	Becks Pond southeast of Newark	25.6 acres	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	1996		2004	1	2002	Nutrients, listed in 1996, delisted 2002
						PCBs	NPS	2002	2009		5		
						Mercury	NPS	2002	2009		5		
DE120-L03	Christina River	Sunset Pond	4a	Sunset Pond south of Newark	40.0 acres	Bacteria	NPS	1996	2004	2005	4a	2006	
						Nutrients	NPS	2002	2004	2004	4a		
						DO	NPS	1996	2004	2004	4a	2006	

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CHESAPEAKE BAY BASIN													
DE100-001	Chesapeake Drainage System	Cypress Branch, including tributaries	5	Mainstem	6.6 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	2002	2005	2005	4a	2006	
						DO	NPS	1996	2005	2005	4a	2006	
				Cypress Branch--from the confluence of Black Stallion Ditch to the MD-DE line	1.60 miles	Biology	NPS	1998	2010		5		
						DO	NPS	1998	2005	2005	4a	2006	
				Tributary of Cypress Branch--from the confluence of the headwaters to the confluence with the mainstem	0.35 miles	Biology	NPS	1998	2010		5		
DE100-002	Chesapeake Drainage System	Sewell Branch, including tributaries	5	Mainstem	7.2 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						DO	NPS	1996	2005	2005	4a	2006	
						Nutrients	NPS	1996	2005	2005	4a	2006	
				From the confluence of the headwaters to the confluence with Sewell Branch	8.20 miles	Biology and Habitat	NPS	1998	2010		5		
				From the confluence of the headwaters to the confluence with Sewell Branch		DO	NPS	1998	2005	2005	4a	2006	
DE100-003	Chesapeake Drainage System	Gravelly Run, including tributaries	5	Mainstem	7.7 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						DO	NPS	1996	2005	2005	1	2008	DO, Listed 1996, delisted 2008
						Nutrients	NPS	1996	2005	2005	4a	2006	
				Gravelly Run--from the confluence of Jamison Branch to the MD-DE line	1.08 miles	Habitat	NPS	1998	2010		5		
				Tributary of Gravelly Run--from the headwaters to the confluence with the mainstem	0.22 miles	Habitat	NPS	1998	2010		5		
				Tributary of Gravelly Run--first western tributary upstream of Gravelly Run	1.21 miles	Biology and Habitat	NPS	1998	2010		5		
				Tributary of Gravelly Run--second eastern tributary from the headwaters of Gravelly Run to the mainstem	1.25 miles	Habitat	NPS	1998	2010		5		
				Gravelly Run--from the start of the third order stream to the confluence with Jamison Branch	2.28 miles	Biology and Habitat	NPS	1998	2010		5		
				From the confluence of Gravelly Run and Jamison Branch to the MD-DE line	1.14 miles	Biology and Habitat	NPS	1998	2010		5		
DE100-004	Chesapeake Drainage System	Tributaries of Elk River	5	First eastern tributary after the headwaters of Great Bohemia Creek	1.55 miles	Habitat	NPS	1998	2010		5		
				Eastern tributary of the headwaters of Back Creek to its confluence	1.26 miles	Biology	NPS	1998	2010		5		

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DE100-005	Chesapeake Drainage System	Tributaries of Sassafras River	5	Western tributary of the headwaters of Sassafras River to its confluence	1.92 miles	Biology	NPS	1998	2010		5		
				From the confluence of the headwaters of Sassafras River to the next larger stream order	0.95 miles	Biology and Habitat	NPS	1998	2010		5		
DE110-001	Choptank	Tappahanna Ditch	5	Mainstem	7.5 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						DO	NPS	1996	2005	2005	1	2008	DO, listed 1996, delisted 2008
						Nutrients	NPS	1996	2005	2005	4a	2006	
				From start of the fourth order stream to the confluence with Tidy Island Creek	6.58 miles	Biology and Habitat	NPS	1998	2010		5		
				Start of third order stream on Tappahanna Ditch to the confluence of the next larger stream order	1.12 miles	Biology and Habitat	NPS	1998	2010		5		
				First western tributary after the headwaters of Tappahanna Ditch to its confluence	0.40 miles	Habitat	NPS	1998	2010		5		
				Tidy Island Creek--from the confluence with Tappahanna Ditch to the MD-DE line	0.21 miles	Habitat	NPS	1998	2010		5		
				Choptank River--from the start of the third order stream to the confluence with Choptank River	2.31 miles	Biology and Habitat	NPS	1998	2010		5		
				Seventh eastern tributary upstream of Tappahanna Ditch	1.30 miles	Habitat	NPS	1998	2010		5		
						DO	NPS	1998	2005	2005	4a	2008	
				Tributary of Tappahanna Ditch--western tributary of the headwaters to its confluence	0.38 miles	Biology and Habitat	NPS	1998	2010		5		
				Second western tributary after the headwaters of Tappahanna Ditch to its confluence	0.88 miles	Biology and Habitat	NPS	1998	2010		5		

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DE110-002	Choptank	Culbreth Marsh Ditch	5	Mainstem	10.0 miles	Bacteria	NPS	1996	2005	2005	4a	2008	
						DO	NPS	1996	2005	2005	1	2008	DO, listed 1996, delisted 2008
						Nutrients	NPS	1996	2005	2005	4a	2006	
				Luther Marvel Prong--from the confluence of the headwaters to the confluence with Culbreth Marsh Ditch	1.07 miles	Biology and Habitat	NPS	1998	2010		5		
				From the confluence of Powell Ditch to the confluence with Ross Prong	1.31 miles	Habitat	NPS	1998	2010		5		
				Culbreth Marsh Ditch--from start of the fourth order stream to the confluence with Mud Millpond (lower half)	1.79 miles	Habitat	NPS	1998	2010		5		
				Culbreth Marsh Ditch--from start of the fourth order stream to the confluence with Mud Millpond (upper half)	1.79 miles	Biology and Habitat	NPS	1998	2010		5		
						DO	NPS	1998	2010		4a		
						Temperature	NPS	1998	2010		5		
				Culbreth Marsh Ditch--from the confluence of Ross Prong to the confluence with the next larger stream order	3.62 miles	Biology and Habitat	NPS	1998	2010		5		
				Culbreth Marsh Ditch--from the confluence of Mud Millpond to the confluence of Cow Marsh Creek	1.86 miles	Biology	NPS	1998	2010		5		
				Third western tributary upstream of Culbreth Marsh Ditch	1.99 miles	Biology and Habitat	NPS	1998	2010		5		
				Ross Prong--from the confluence of the headwaters to the confluence with Culbreth Marsh Ditch	2.61 miles	Biology and Habitat	NPS	1998	2010		5		

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DE110-003	Choptank	Cow Marsh Creek	5	Mainstem	15.1 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						DO	NPS	1996	2005	2005	1	2008	DO, listed 1996, delisted 2008
						Nutrients	NPS	1996	2005	2005	4a	2006	
				First upstream tributary on Meredith Branch	0.46 miles	Habitat	NPS	1998	2010		5		
				From the confluence of the headwaters of Sangston Prong to the confluence Gravelly Branch	1.98 miles	Biology and Habitat	NPS	1998	2010		5		
				Tributary of Gary Mill Pond Branch--from the confluence of the headwaters to the confluence with Gary Mill Pond Branch	1.00 miles	Biology and Habitat	NPS	1998	2010		5		
				First eastern tributary after the headwaters of Wildcat Branch	1.21 miles	Biology and Habitat	NPS	1998	2010		5		
				Willow Grove Prong--from the start of the third order stream to the confluence with Cow Marsh Creek	1.24 miles	Biology and Habitat	NPS	1998	2010		5		
				Tributary of Cow Marsh Creek--first eastern tributary upstream of Cow Marsh Creek	1.32 miles	Biology	NPS	1998	2010		5		
				Cow Marsh Ditch--from start of third order stream to the confluence with Cow Marsh Creek	1.44 miles	Habitat	NPS	1998	2010		5		
				Cow Marsh Ditch--from the confluence of the headwaters to the confluence with the next larger stream order	1.49 miles	Habitat	NPS	1998	2010		5		
				Bullock Prong--mainstem to the confluence with Price Prong	3.12 miles	Habitat	NPS	1998	2010		5		
				Third tributary upstream of Cow Marsh Ditch--from the headwaters to the confluence with Cow Marsh Ditch	1.86 miles	Habitat	NPS	1998	2010		5		
				Iron Mine Prong--from the confluence of Black Swamp to the next larger stream order	2.02 miles	Habitat	NPS	1998	2010		5		
				Meredith Branch--from the start of the third stream order to the confluence with the next larger stream order	2.08 miles	Biology and Habitat	NPS	1998	2010		5		
				White Marsh Branch--from the start of the third order stream to the confluence with Gravelly Branch and Sangston Prong	2.92 miles	Biology	NPS	1998	2010		5		
				Cow Marsh Creek--from the confluence of Iron Mine Prong to the confluence with Choptank River	4.97 miles	Habitat	NPS	1998	2010		5		

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DE110-L01	Choptank	Mud Mill Pond	5	Pond south of Marydel	60.0 acres	Bacteria	NPS	1996	2005	2006	4a	2008	
						DO	NPS	1996	2005	2005	4a	2006	
						Nutrients	NPS	1996	2005	2005	4a	2006	
DE200-001	Marshyhope Creek	Marshyhope Creek	5	From the headwaters to the State Line	19.7 miles	Bacteria	NPS	1996	2005	2006	1	2008	Bacteria, listed 1996, delisted 2008
						DO	NPS	1996	2005	2005	1	2008	DO, listed 1996, delisted 2008
						Nutrients	NPS	1996	2005	2005	4a	2006	
				Tributary to Black Arm Prong--third tributary upstream of Black Arm Prong	0.56 miles	Habitat	NPS	1998	2010		5		
				Marshyhope Creek--from the confluence of Prospect Branch to the confluence with the MD-DE line	8.78 miles	Habitat	NPS	1998	2010		5		
				From the confluence of Black Prong and Marshyhope Ditch to the confluence of Prospect Branch	4.50 miles	Biology and Habitat	NPS	1998	2010		5		
DE200-002	Marshyhope Creek	Tributaries from the headwaters to the State line	5	Marshyhope Ditch	6.26 Miles	DO	NPS	2002	2005	2005	4a	2006	
						Nutrients	NPS	2002	2005	2005	4a	2006	
						Bacteria	NPS	2002	2005	2006	4a	2008	
				First tributary upstream of Prong No. 2--from the eastern headwater to its confluence	0.55 miles	Habitat	NPS	1998	2010		5		
				Point Branch--from the headwaters to the confluence with the first tributary downstream	0.80 miles	Habitat	NPS	1998	2010		5		
				Tributary of Tomahawk Branch--third eastern tributary downstream of the headwaters	1.54 miles	Habitat	NPS	1998	2010		5		
				Tributary of Tomahawk Branch--first eastern tributary upstream	0.69 miles	Habitat	NPS	1998	2010		5		
				Tributary of Salisbury Creek--from the MD-DE line to the confluence with Salisbury Creek	0.82 miles	Biology and Habitat	NPS	1998	2010		5		
				Salisbury Creek--from the start of the third order stream to the confluence with Cattail Branch (upper half)	0.60 miles	Biology and Habitat	NPS	1998	2010		5		
				Salisbury Creek--from the start of the third order stream to the confluence with Cattail Branch (lower half)	0.60 miles	Habitat	NPS	1998	2010		5		

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	Marshyhope Creek	Tributaries from the headwaters to the State line	5	Prospect Branch--western tributary of the headwaters to its confluence	1.25 miles	Habitat	NPS	1998	2010		5		
				Prong No. 2--from the start of the third order stream to the confluence with Bright-Haines Glade Branch	1.50 miles	Biology and Habitat	NPS	1998	2010		5		
				From the confluence of the headwaters of Green Branch to the confluence with Marshyhope Creek	3.51 miles	Biology and Habitat	NPS	1998	2010		5		
				Tributary of Salisbury Creek--from the MD-DE line to the confluence with Salisbury Creek	1.21 miles	Biology and Habitat	NPS	1998	2010		5		
				Short and Hall Ditch--from the confluence of the headwaters of with Marshyhope Creek	1.45 miles	Habitat	NPS	1998	2010		5		
				Brights Branch--from the start of the third order stream to the MD-DE line	1.78 miles	Habitat	NPS	1998	2010		5		
				Bright-Haines Glade Branch--from the start of the fourth order stream and Prospect Branch to the confluence with	1.30 miles	Habitat	NPS	1998	2010		5		
						DO	NPS	1998	2010	2005	4a	2008	
						Temperature	NPS	1998	2010		5		
				Cattail Branch--from the start of the fourth order stream to the confluence with Salisbury Creek (upper half)	2.17 miles	Biology and Habitat	NPS	1998	2010		5		
				Cattail Branch--from the start of the fourth order stream to the confluence with Salisbury Creek (lower half)	2.17 miles	Habitat	NPS	1998	2010		5		
						DO	NPS	1998	2010	2005	4a	2008	
						Temperature	NPS	1998	2010		5		
				Tributary to Black Arm Prong--second tributary after the headwaters	0.52 miles	Habitat	NPS	1998	2010		5		
				Eastern tributary of the headwaters of Cattail Branch to its confluence	0.87 miles	Habitat	NPS	1998	2010		5		
				From the confluence of the headwaters of Green Branch to the confluence Marshyhope Creek	2.34 miles	Biology and Habitat	NPS	1998	2010		5		
				Tributary to Cattail Branch--fourth western tributary downstream of the headwaters of Cattail Branch	1.08 miles	Biology and Habitat	NPS	1998	2010		5		
				Tributary of Prong No. 2--from the start of the third order stream to the confluence with Bright-Haines Glade Branch	1.50 miles	Habitat	NPS	1998	2010		5		
				Tributary to Cattail Branch--third western tributary upstream of Salisbury Creek	1.06 miles	Habitat	NPS	1998	2010		5		
				Tributary to Tomahawk Branch--first western tributary after the headwaters	0.95 miles	Habitat	NPS	1998	2010		5		

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DE240-001	Nanticoke River	Lower Nanticoke River	4a	From the head of tide in Middleford to the MD-DE State line	15.1 miles	Bacteria	PS, NPS	1996		2006	1	2004	Bacteria, listed in 1996, delisted 2004
						Nutrients	PS, NPS	1996		1998	4a	2004	
						DO	PS, NPS	1996		1998	4a	2004	
DE240-002	Nanticoke River	Upper Nanticoke River	5	From the headwaters of the Nanticoke River to the head of tide at Middleford	18.6 miles	Bacteria	PS, NPS	1996		2006	1	2004	Bacteria, listed in 1996, delisted 2004
						Nutrients	PS, NPS	1996		1998	4a	2004	
						DO		1996		1998	1	2002	DO, listed in 1996, delisted 2002 .
				Tributary of White Marsh Branch--first western tributary downstream of the headwaters of White Marsh Branch	0.49 miles	Habitat	NPS	1998	2010		5		
				Kent-Sussex Line Branch--from the start of the third order stream to the confluence with Nanticoke River (lower half)	1.33 miles	Habitat	NPS	1998	2010		5		
				Kent-Sussex Line Branch--from the start of the third order stream to the confluence with Nanticoke River (upper half)	1.33 miles	Biology and Habitat	NPS	1998	2010		5		
				Nanticoke Branch--from the confluence of Polk Branch to the confluence with Gum Branch	2.48 miles	Habitat	NPS	1998	2010		5		
				Grubby Neck Branch--from the confluence of Polk Branch to the confluence with Gum Branch	1.24 miles	Habitat	NPS	1998	2010		5		
				Nanticoke Branch--from the confluence of Kent-Sussex Line Branch to the confluence with Cart Branch	5.23 miles	Habitat	NPS	1998	2010		5		
				Nanticoke River--from the start of the third order stream to the confluence with Kent-Sussex Line Branch.	3.13 miles	Biology and Habitat	NPS	1998	2010		5		
				Tributary to Marsh Branch--first eastern tributary after the headwaters to its confluence	0.83 miles	Habitat	NPS	1998	2010		5		
DE240-003	Nanticoke River	Clear Brook Branch	4a	From the headwaters of Clear Brook, Friedel Prong, and Bucks Branch to the confluence with Williams Pond	12.9 miles	Bacteria	NPS	1996	2005	2006	1	2006	Bacteria, listed in 1996, delisted 2006
						Nutrients	NPS	1996		2000	4a	2004	
						DO	NPS	1996		2000	1	2006	DO, listed in 1996, delisted 2006.

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DE240-004	Nanticoke River	Deep Creek Branch	5	From the headwaters above Concord Pond to the confluence with the	5.5 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
				McColleys Branch--from the confluence of New Ditch to the confluence with Deep Creek	3.24 miles	Habitat	NPS	1998	2010		5		
				Deep Creek--from the start of the third order stream to the confluence with Deep Creek and McColleys Branch	2.51 miles	Habitat	NPS	1998	2010		5		
				Tyndall Branch--from the start of the third order stream on Stoney Creek to the confluence of Tyndall Branch and Deep Creek	5.00 miles	Habitat	NPS	1998	2010		5		
DE240-005	Nanticoke River	Gravelly Branch	5	From the headwaters of Gravelly Branch above Collins Pond to the confluence	6.5 miles	Bacteria	NPS	1996	2005	2006	1	2008	Bacteria, listed 1996, delisted 2008
						Nutrients	NPS	1996		2000	4a	2004	
				Gravelly Branch--from the start of the third order stream to the confluence with the next larger stream order	2.12 miles	Habitat	NPS	1998	2010		5		
				Prong No. 1--from the start of fourth order stream to the confluence with Gravelly Branch on Nanticoke River	0.73 miles	Habitat	NPS	1998	2010		5		
				Maple Branch-- from the start of the third order stream to the confluence with Prong No. 1	1.0 mile	Habitat	NPS	1998	2010		5		
DE240-006	Nanticoke River	Bridgeville Branch	5	From the headwaters of Bridgeville Branch to the confluence with Nanticoke River	7.2 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
						DO	NPS	1996		2000	4a	2004	
				Bridgeville Branch---from the start of the third order stream to the confluence with Nanticoke River	3.92 miles	Habitat	NPS	1998	2010		5		
DE240-007	Nanticoke River	Gum Branch	5	From the headwaters located northeast of Woodland Ferry to the confluence with	6.0 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
				Gum Branch.--from the start of the third order stream to the confluence with Nanticoke River	2.37 miles	Habitat	NPS	1998	2010		5		
DE240-008	Nanticoke River	Lewes Creek	4a	Lewes Creek, including Butler Mill Branch and Chapel Branch	10.3 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
						DO	NPS	2002		2000	4a	2004	
DE240-009	Nanticoke River	DuPont Gut	n/a	DuPont Gut has been determined by USEPA not to be Waters of the U.S. , therefore the prior listing was withdrawn in 2002. This information is provided for continuity with prior 303(d) lists.	1.0 mile	Temperature	PS	1996				2002	Temperature, listed in 1996, delisted 2002 based on new information and US EPA findings.

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DE240-010	Nanticoke River	Gum Branch on Upper Nanticoke River	5	Gum Branch--from the confluence of Stallion Head Branch to the confluence with West Branch Gum Branch	3.51 miles	Habitat	NPS	1998	2010		5		
				Toms Dam Branch--from the start of the third order stream to the confluence with Gum Branch	5.23 miles	Habitat	NPS	1998	2010		5		
DE240-L01	Nanticoke River	Craigs Pond	4a	Pond southwest of Seaford and below Butler Mill Branch	11.9 acres	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
						DO	NPS	2002		2000	4a	2004	
DE240-L02	Nanticoke River	Concord Pond	4a	Pond east of Seaford on Deep Creek Branch	87.4 acres	Nutrients	NPS	1996		2000	4a	2004	
DE240-L04	Nanticoke River	Williams Pond	4a	Pond located in Seaford and below Middleford	100.0 acres	Nutrients	NPS	1996		2000	4a	2004	
						Bacteria	NPS	2002	2005	2006	1	2006	Bacteria, Listed in 2002, delisted 2006
DE240-L05	Nanticoke River	Hearns Pond	4a	Pond located north of Seaford on Clear Brook Branch	67.0 acres	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
DE050-001	Broad Creek	Lower Broad Creek	5	Lower Broad Creek, including Collins and Culvert Ditch, Holly Ditch, and Rossakatum and Cooper Branches	24.8 miles	Bacteria	PS, NPS	1996	2005	2006	4a	2008	
						Nutrients	PS, NPS	1996		1998	4a	2004	
						DO	PS, NPS	2002		1998	4a	2004	
				Cooper Branch--from the start of the third order stream on Rossakatum Branch to the confluence of Broad Creek	2.73 miles	Habitat	NPS	1998	2010		5		
DE050-002	Broad Creek	Tussocky Branch	5	Tributary west of Laurel, excluding Portsville and Tussock Ponds	7.9 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
				Tussocky Branch--from the confluence of Mill Creek to the confluence with Broad Creek	3.42 miles	Habitat	NPS	1998	2010		5		
DE050-003	Broad Creek	Little Creek	5	Tributary south of Laurel, excluding Horsey's Pond	2.4 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
DE050-004	Broad Creek	Chipman Pond Branch	5	Tributary northeast of Laurel, excluding Chipman Pond	6.7 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
				Jobs Ditch--from the headwaters to the confluence with Dukes and Jobs Branch	0.98 miles	Habitat	NPS	1998	2010		5		
				Mirey Branch--from the start of the third order stream to the confluence with Elliott Pond Branch	1.28 miles	Habitat	NPS	1998	2010		5		
				Dukes Ditch--from the headwaters to the confluence with Dukes and Jobs Branch	2.45 miles	Habitat	NPS	1998	2010		5		
DE050-005-01	Broad Creek	James Branch	4a	James Branch, including Pepper Pond Branch, Hitch Pond Branch, and Grays Branch	11.1 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
						DO	NPS	2002		2000	4a	2004	

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DE050-005-02	Broad Creek	Trussum Pond Branch	4a	From the headwaters to the confluence with James Branch, excluding Trussum Pond	3.5 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
				Wards Branch--from the confluence of the headwaters to the confluence with James Branch	3.18 miles	DO	NPS	1998		2000	4a	2004	
DE050-006-01	Broad Creek	Trap Pond Branch	4a	From the headwaters of Trap Pond including Saunders and Thompson	2.9 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
DE050-006-03	Broad Creek	Raccoon Prong	4a	Headwaters of Raccoon Pond and Trap pond	9.11 miles	Bacteria	NPS	2002	2005	2006	4a	2008	Bacteria, listed 2002, delisted 2006, relisted 2008
						Nutrients	NPS	2002		2000	4a	2004	
						DO	NPS	2002		2000	4a	2004	
DE050-L01	Broad Creek	Portsville Pond	4a	Pond west of Laurel on Tussocky Branch	14.5 acres	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
DE050-L02	Broad Creek	Tussock Pond	4a	Pond southwest of Laurel	8.6 acres	Bacteria	NPS	2002	2005	2006	4a	2008	
						Nutrients	NPS	2002		2000	4a	2004	
DE050-L03	Broad Creek	Horseys Pond	4a	Pond south of Laurel on Little Creek tributary	46.3 acres	Bacteria	NPS	1996		2006	1	2004	Bacteria , listed in 1996, delisted 2004
						Nutrients	NPS	1996		2000	4a	2004	
DE050-L04	Broad Creek	Records Pond	4a	Pond adjacent to Laurel	91.9 acres	Bacteria	PS, NPS	1996	2005	2006	1	2008	Bacteria, Listed in 1996, delisted 2008
						Nutrients	PS, NPS	1996		2000	4a	2004	
						DO		1996 / 2006		2000	1	2008	DO, listed in 1996, delisted 2002, relisted 2006, delisted 2008
DE050-L05	Broad Creek	Chipman Pond	4a	Pond located north of Laurel on Chipman Branch	47.0 acres	Nutrients	NPS	1996		2000	4a	2004	
						Bacteria	NPS	2002	2005	2006	4a	2008	
DE050-L06	Broad Creek	Trussum Pond	4a	Pond southeast of Laurel on James Branch	58.7 acres	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
						DO	NPS	2002		2000	4a	2004	
DE050-L07	Broad Creek	Trap Pond	4a	Pond east of Laurel on Hitch Pond Branch	88.0 acres	Nutrients	NPS	1996		2000	4a	2004	
						DO	NPS	2002		2000	4a	2004	
						Bacteria		1996		2006	1	2002	Bacteria, listed in 1996, delisted 2002
DE050-L08	Broad Creek	Raccoon Pond	4a	Pond east of Laurel on Hitch Pond Branch	13.5 acres	Bacteria	NPS	1996	2005	2006	4a	2008	
						Nutrients	NPS	1996		2000	4a	2004	
						DO	NPS	2002		2000	4a	2004	
DE250-001	Pocomoke River	Pocomoke River	5	Pocomoke River, from headwaters to the MD-DE State line	11.8 miles	Bacteria	NPS	1996	2005	2006	4a	2008	
						DO	NPS	1996	2005	2005	1	2008	DO, listed 1996, delisted 2008
						Nutrients	NPS	1996	2005	2005	4a	2006	
				Pocomoke River--from the confluence of Bald Cypress Branch and Gum Branch to the MD-DE line	0.99 miles	Habitat	NPS	1998	2010		5		
				Pocomoke River--from start of the third order stream to the confluence with Bald Cypress Branch and Gum Branch	4.55 miles	Habitat	NPS	1998	2010		5		
DE250-002	Pocomoke River	Tributaries from the headwaters to MD-DE State line	5	Bald Cypress Branch--from the confluence of the headwaters to the confluence with the next larger stream order	3.5 miles	Habitat	NPS	1998	2010		5		
						Bacteria	NPS	2004	2005	2005	4a	2006	
						Nutrients	NPS	2004	2005	2005	4a	2006	
						DO	NPS	2006		2005	4a	2006	

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INLAND BAYS/ATLANTIC OCEAN BASIN													
DE170-001	Lewes and Rehoboth Canal	Lewes and Rehoboth Canal	4a	Tidal waters from the confluence of Delaware Bay to the confluence with Rehoboth Bay	8.9 miles	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						Nutrients	PS, NPS	1996	2003	2004	4a	2006	
						DO		1996 , 2004	2003	2004	4a	2006	DO, listed in 1996, delisted 2002 and relisted 2004.
DE280-001-01	Rehoboth Bay	Chapel Branch	5	From the headwaters of Chapel Branch to the confluence of Herring Creek, including Hopkins Prong, Unity Branch,	27.0 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2003	2004	4a	2006	
						DO	NPS	1996		2004	1	2004	DO, listed in 1996, delisted 2004
				Chapel Branch--from the start of the second order stream to the confluence with Herring Creek	3.75 miles	Habitat	NPS	1998	2013		5		
DE280-002	Rehoboth Bay	Love Creek, including tributaries	4a	Love Creek, Bundicks Branch and Goslee Creek to the confluence with Rehoboth Bay	4.2 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2003	2004	4a	2006	
						DO		1996		2004	1	2002	DO, listed in 1996, delisted 2002
DE280-E01	Rehoboth Bay	Rehoboth Bay	4a	Near coastal waters extending north from the confluence with Indian River Bay at Burton Island	12.0 sq. mi.	DO	PS, NPS	1996		1998	1	2006	DO, listed 1996, delisted 2006
						Nutrients	PS, NPS	1996		1998	4a	2004	
DE280-L01	Rehoboth Bay	Burton Pond	4a	Pond northeast of Millsboro	33.0 acres	Nutrients	NPS	1998	2003	2004	4a	2006	
DE140-001	Indian River	White Creek	4a	Saline tidal waters extending from the north end of Assawoman Canal to the Indian River Bay	4.9 miles	Bacteria	NPS	1996	2006	2006	1	2008	Bacteria, listed 1996, delisted 2008
						Nutrients	NPS	1996	2003	2004	4a	2006	
						DO	NPS	1996	2003	2004	1	2008	DO, listed 1996, delisted 2008
DE140-002	Indian River	Blackwater Creek	4a	Saline tidal waters from the headwaters to the confluence with Indian River Bay	7.2 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	2002	2003	2004	4a	2006	
						Nutrients	NPS	2002	2003	2004	4a	2006	
DE140-003	Indian River	Pepper Creek, including tributaries	4a	Pepper Creek including Vines Creek, McCrays Branch, and Deep Hole Branch	24.8 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2003	2004	4a	2006	
						DO	NPS	1996	2003	2004	4a	2006	
DE140-004	Indian River	Indian River	4a	Saline tidal portion of river from Millsboro Pond to Power Plant intake	4.6 miles	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						Nutrients	PS, NPS	1996		1998	4a	2004	
						Temperature	PS, NPS	1996	1998	2004	4a	2004	EPA TMDL December 2004
						SS	PS, NPS	1996		1998	4a	2004	
						DO	PS, NPS	2002		1998	4a	2004	

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DE140-005	Indian River	Swan Creek	4a	Freshwater tidal river from the headwaters of Swan Creek to the confluence with Indian River	8.6 miles	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						Nutrients	PS, NPS	1996	2003	2004	4a	2006	
						Temperature							Temperature, listed in 1996, delisted in 2002 as sole point source discharger was removed
DE140-006	Indian River	Stockley Branch	4a	From the confluence of Alms House Ditch with Stockley Branch to the confluence with Millsboro Pond	8.23 miles	Bacteria	PS, NPS	1996	2006	2006	1	2008	Bacteria, listed 1996, delisted 2008
						Nutrients	PS, NPS	1996	2003	2004	4a	2006	
						DO	PS, NPS	2002		2004	1	2004	DO, listed in 2002, delisted 2004
DE140-007	Indian River	Eli Walls Tax Ditch	4a	From the headwaters of McGee Ditch, Eli Walls Tax Ditch, and Gills Branch to the confluence with Morris Millpond	13.6 miles	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						Nutrients	PS, NPS	1996	2003	2004	4a	2006	
DE140-008	Indian River	Deep Branch, including tributary	4a	Deep Branch, including Peterkins Branch, White Oak Swamp Ditch, Sockorockets Ditch, Welsh Branch, and Simpler Branch	16.9 miles	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						Nutrients	PS, NPS	1996	2003	2004	4a	2006	
						DO	PS, NPS	1996	2003	2004	4a	2006	
DE140-009	Indian River	Mirey Branch, including tributaries	5	Mirey Branch, including Sheep Pen Ditch, and Narrow Drain	23.5 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	2004	2003	2004	4a	2006	
				Mirey Branch-- from the confluence of the headwaters to the confluence with Sheep Pen Ditch	5.40 miles	Habitat	NPS	1998	2013		5		
DE140-010	Indian River	Betts Pond Branch	4a	From the headwaters of the tributaries of Ingrams Pond and Betts Pond to the confluence with Millsboro Pond,	17.5 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	2002	2003	2004	4a	2006	
						Nutrients	NPS	2002	2003	2004	4a	2006	
DE140-E01	Indian River	Lower Indian River Bay	4a	From inlet to Pepper Creek	13.0 sq. mi.	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						Nutrients	PS, NPS	1996		1998	4a	2004	
						DO	PS, NPS	1996		1998	1	2008	DO, listed 1996, delisted 2008
DE140-E02	Indian River	Upper Indian River Bay	4a	Upper portion of estuary from power plant cooling water intake to Pepper Creek, including Island Creek	0.95 sq. mi.	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996		1998	4a	2004	
						Temperature	NPS	1996	1998	2004	4a	2004	EPA TMDL December 2004
						DO	NPS	2002		1998	4a	2004	
DE140-L01	Indian River	Millsboro Pond	4a	Pond north of Millsboro	126.0 acres	Bacteria	PS, NPS	1996		2006	1	2006	Bacteria, listed 1996, delisted 2006
						Nutrients	PS, NPS	1996	2003	2004	4a	2006	
						DO		1996, 2004		2004	1	2006	DO, listed in 1996, delisted 2002, relisted 2004, delisted 2006

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DE140-L02	Indian River	Betts Pond	4a	Pond northwest of Millsboro	80.0 acres	Nutrients	NPS	1996	2003	2004	4a	2006	
						Bacteria	NPS	1996		2006	1	2004	Bacteria, listed in 1996, delisted 2004
DE140-L03	Indian River	Ingrams Pond	4a	Pond west of Millsboro	48.0 acres	Bacteria	NPS	1996	2003	2006	4a	2008	
						Nutrients	NPS	1996	2003	2004	4a	2006	
DE140-L04	Indian River	Morris Mill Pond	4a	Pond between Millsboro and Georgetown	44.0 acres	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
DE150-001	Iron Branch	Iron Branch	5	From the headwaters of Iron Branch and Whartons Branch to the confluence with Indian River	13.1 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2003	2004	4a	2006	
						DO	NPS	1996	2003	2004	1	2008	DO, listed 1996, delisted 2008
				Whartons Ditch--from the start of the third order stream to the confluence with Whartons Branch	3.55 miles	Habitat	NPS	1998	2013		5		
						DO	NPS	1998	2013	2004	4a	2006	
						Temperature	NPS	1998	2013		5		
DE070-001	Buntings Branch	Buntings Branch	4a	From the headwaters to the MD-DE State line	4.6 miles	Nutrients	PS, NPS	1996	2003		4b		
						DO	PS, NPS	1996	2003		1	2008	Delaware DNREC, EPA and MD Dept. of Environment are working cooperatively to implement the MD TMDL for the downstream portion in Delaware's portion of this shared waterbody for these parameters. DO, listed 1996, delisted 2008.
						Bacteria	PS, NPS	2002	2006	2006	4a	2008	
DE350-E01	Assawoman Bay	Assawoman Bay	4a	Portion of the estuary up to the MD-DE State line	0.59 sq. mi.	Bacteria	NPS	1998	2006	2006	4a	2008	
DE180-001	Little Assawoman Bay	Little Assawoman Canal	4a	Saline tidal waters from the confluence with White Creek to the confluence with little Assawoman Bay	3.1 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2003	2004	4a	2006	
						DO	NPS	1996	2003	2004	4a	2006	
DE180-002	Little Assawoman Bay	Miller Creek	5	From the headwaters of Miller Creek to the confluence with Little Assawoman bay	6.5 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2003	2004	4a	2006	
						Nutrients	NPS	1996	2003	2004	4a	2006	
				Beaver Dam Ditch--from the confluence of Blackwater Creek to the confluence with the next larger stream order	2.31 miles	Habitat	NPS	1998	2013		5		
DE180-003	Little Assawoman Bay	Dirickson Creek	5	From the headwaters of Dirickson Creek to the confluence with Little Assawoman bay	13.3 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2003	2004	4a	2006	
						DO	NPS	2002	2003	2004	4a	2006	
				Bearhole Ditch--from the confluence. of the headwaters to the confluence with Batson Branch	2.39 miles	Habitat	NPS	1998	2013		5		
				Agricultural Ditch--from the confluence of the headwaters to the confluence with Dirickson Creek	2.97 miles	Habitat	NPS	1998	2013		5		
DE180-E01	Little Assawoman Bay	Little Assawoman Bay	4a	Estuary from the confluence with Assawoman Canal to the confluence with Assawoman Bay	3.0 sq. mi.	Bacteria	NPS	1996	2006	2006	1	2006	Bacteria, Listed 1996, delisted 2006
						DO	NPS	1996	2003	2004	1	2008	DO, listed 1996, delisted 2008
						Nutrients	NPS	1996	2003	2004	4a	2006	

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DELAWARE BAY BASIN													
NA	Delaware River	DRBC Zone 5	5	From the Pennsylvania- Delaware line to Liston Point, Delaware.	59.0 sq. mi.	Bacteria	PS, NPS	1996	2005		1		Bacteria , listed in 1996, delisted 2004 based on 2004 DRBC 305(b) assessment
						PCBs	PS, NPS, SF	1996	2005	2003	4a	2006	
						Arsenic		2002			1	2006	Not a contaminant of concern in fish consumption advisories for these waters
						Dioxin		2002	2015		5		
						Mercury		2002	2011		5		
						Chlorinated Pesticides		2002	2011		5		
						Chronic Toxicity (DRBC Zones 5a and 5b, 25 sq miles)	PS, NPS, SF	2002			3		The protocol for gathering chronic toxicity data and related information has been questioned. There is a need to collect supplementary data in order to determine the validity of the data used for this listing and the extent of impairment which may exist in the river segment.
						Iron		2004			3		Surface water levels of iron in the segment sometimes exceed the applicable criterion. The Department believes further study of surface water iron levels and a determination of whether a use impairment is resulting from those levels is an appropriate response to the available information.
NA	Delaware River	DRBC Zone 5c	5	Lower portion of DRBC Zone 5	31 sq. mi.	DO	PS, NPS	2006	2019		5		Delaware will work with the DRBC, EPA, other States and Stakeholders to develop and implement a TMDL in these waters.
DE020-001	Army Creek	Lower Army Creek	5	Segment from Route 13 to mouth at Delaware River tidal freshwater segment	3.0 miles	Nutrients		1996	2006	2006	4a	2008	
						DO		1996	2006	2006	4a	2008	
						Bacteria		2002	2006	2006	4a	2008	
						PCBs		2006	2013		5		
						Dioxin/Furans		2006	2013		5		
						Dieldrin		2006	2013		5		
						Toxaphene		2006	2013		5		
				First tributary on Army Creek after the headwaters	0.73 miles	Habitat	NPS	1998	2011		5		
				Segment from Route 13 to the mouth of the Delaware River	2.00 miles	Biology and Habitat	NPS	1998	2011		5		
DE020-002	Army Creek	Upper Army Creek	5	Nontidal segment from headwaters to Route 13	1.1 miles	Nutrients	NPS	1998	2006	2006	4a	2008	
						DO	NPS	1998	2006	2006	4a	2008	
						Bacteria	NPS	2002	2006	2006	4a	2008	
						PCBs		2006	2013		5		
						Dioxin/Furans		2006	2013		5		
						Dieldrin		2006	2013		5		
						Toxaphene		2006	2013		5		
DE020-003	Army Creek	Tributary to Army Creek	4a	Unnamed Tributary to Army Creek, monitored by STORET station 114051	0.78 miles	Bacteria	NPS	2006	2006	2006	4a	2008	
						Nutrients	NPS	2006	2006	2006	4a	2008	
						DO	NPS	2006	2006	2006	1	2008	DO, listed 2006, delisted 2008
						DO	NPS	1996	2006	2006	4a	2008	

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DE270-001-01	Red Lion Creek	Lower Red Lion	5	From U.S. Route 13 to the mouth at Delaware River	1.5 miles	Nutrients	NPS	1996	2006	2006	4a	2008	
						Chlorinated Benzenes		1996			1	2002	Chlorinated Benzene, listed in 1996, delisted 2002 based on improved conditions.
						Bacteria	NPS	2002	2006	2006	4a	2008	
						PCBs	NPS	2002	2011		5		
						Dioxins	NPS	2002	2011		5		
				First tributary downstream of Doll Run from the headwaters to the confluence with Red Lion Creek	0.91 miles	Biology	NPS	1998	2011		5		
DE270-001-02	Red Lion Creek	Upper Red Lion	5	From the headwaters to the location where Route 13 intersects Red Lion	1.9 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
				First tributary after the headwaters of Red Lion Creek	0.28 miles	Biology	NPS	1998	2011		5		
DE130-001	Dragon Run Creek	Lower Dragon Run Creek	4a	From dam at the water supply pond to the mouth of Delaware River	3.2 miles	Nutrients	NPS	1998	2006	2006	4a	2008	
						DO	NPS	1998	2006	2006	4a	2008	
						Bacteria	NPS	2002		2006	4a	2008	Bacteria, listed 2002, delisted 2006, relisted 2008

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DE130-002	Dragon Run Creek	Upper Dragon Run Creek	5	From headwaters to water supply pond	4.1 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
				From the confluence of the headwaters to the water supply dam	3.42 miles	Biology	NPS	1998	2011		5		
DE090-001	Chesapeake & Delaware Canal	C&D Canal	5	C&D Canal from the MD Line to Delaware River	15.0 M	Nutrients	NPS	2002	2011		5		
						PCBs	NPS	2002	2011		5		
						Dioxins	NPS	2002	2011		5		
						Dieldrin	NPS	2006	2011		5		
						Chlordane	NPS	2006	2011		5		
DE090-002	Chesapeake & Delaware Canal	Tributaries of Chesapeake & Delaware Canal	5	Scott Run-- from the headwaters to the confluence with Chesapeake & Delaware Canal	4.81 miles	Biology and Habitat	NPS	1998	2011		5		
						DO	NPS	1998	2006	2006	5		
				Crystal Run--from the headwaters to the confluence with Chesapeake & Delaware Canal	1.52 miles	Biology	NPS	1998	2011		5		
				Joy Run--from the headwaters to the confluence with Chesapeake & Delaware Canal	1.99 miles	Biology	NPS	1998	2011		5		
				Eastern tributary on Lums Pond--from the headwaters to the confluence with Lums Pond	1.04 miles	Biology and Habitat	NPS	1998	2011		5		
DE090-L01	Chesapeake & Delaware Canal	Lums Pond	4a	Pond south of Newark	189.3 acres	Bacteria	NPS	1996			1	2004	Bacteria, listed in 1996, delisted 2004
						Nutrients	NPS	2002		2011	5		
DE010-001-01	Appoquinimink River	Lower Appoquinimink River	5	Saline Tidal Reach, excluding Hangman's Run	7.1 miles	DO	PS, NPS	1996		1998	4a	2004	
						Nutrients	PS, NPS	1996		1998	4a	2004	
						Bacteria	NPS	2002	2006	2006	1	2006	Bacteria, listed 2002, delisted 2006
						PCBs	NPS	2002	2011		5		
						Dioxins	NPS	2002	2011		5		
DE010-001-02	Appoquinimink River	Upper Appoquinimink River	5	Freshwater Tidal Reach	6.1 miles	Nutrients	PS, NPS	1996		1998	4a	2004	
						DO	PS, NPS	1996		1998	4a	2004	
						Bacteria	PS, NPS	2002	2006	2006	4a	2008	
						PCBs	NPS	2002	2011		5		
						Dioxins	NPS	2002	2011		5		
DE010-001-03	Appoquinimink River	Drawyer Creek	5	From the headwaters of Drawyer Creek to the confluence with the Appoquinimink River, including Shallcross Lake	8.2 miles	Bacteria	NPS	1996	2006	2006	1	2008	Bacteria, listed 1996, delisted 2008
						Nutrients	NPS	1996		2003	4a	2004	
						DO	NPS	1996		2003	1	2008	DO, listed 1996, delisted 2008
				Tributary of Drawyer Creek--from the confluence of the headwaters to the confluence with the mainstem	2.30 miles	Biology and Habitat	NPS	1998	2011		5		
				Western tributary of the headwaters of Drawyer Creek to its confluence	2.20 miles	Habitat	NPS	1998	2011		5		
				Tidal Portion	5.45	PCBs	NPS	2002	2011		5		

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				Tidal Portion	miles	DDT	NPS	2002	2011		5		

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DE010-002-01	Appoquinimink River	Wiggins Mill Pond to confluence with Silver Lake	5	From the headwaters of Wiggins Mill Pond to the confluence with Noxontown Pond	3.4 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996		2003	4a	2004	
						Nutrients	NPS	2002		2003	4a	2004	
				From the confluence of the headwaters of Wiggins Mill Pond to the confluence with Noxontown Pond	1.62 miles	Biology	NPS	1998	2011		5		
DE010-002-02	Appoquinimink River	Deep Creek to confluence with Silver Lake	5	From the headwaters of Deep Creek to confluence with Silver Lake, excluding Silver Lake	2.4 miles	Bacteria	NPS	2002	2006	2006	4a	2008	
						Nutrients	NPS	2002		2003	4a	2004	
						DO		1996		2003	1	2002	DO, listed in 1996, delisted 2002
				First western tributary after the headwaters of Silver Lake	1.98 miles	Biology	NPS	1998	2011		5		
				Deep Creek.-- from the confluence of the headwaters to Appoquinimink River	1.84 miles	Biology	NPS	1998	2011		5		
DE010-L01	Appoquinimink River	Noxontown Pond	4a	Pond southwest of Odessa	158.6 acres	Bacteria	NPS	1998		2006	1	2006	Bacteria, listed 1998, delisted 2006
						Nutrients	NPS	1998		2003	4a	2004	
DE010-L02	Appoquinimink River	Silver Lake	5	Lake adjacent to Middletown, below Deep Creek	38.7 acres	Bacteria	NPS	1996			1	2006	Bacteria, listed in 1996, delisted 2006
						Nutrients	NPS	1996	2001		5		
						PCB	NPS	2002	2011		5		
						Dieldrin	NPS	2002	2011		5		
						DDT	NPS	2002	2011		5		
						Dioxin	NPS	2002	2011		5		
DE010-L03	Appoquinimink River	Shallcross Lake	4a	Lake above Drawyer Creek	43.1 acres	Nutrients	NPS	1996	2001	2003	4a	2004	
						Bacteria	NPS	1996			1	2004	Bacteria, listed in 1996, delisted 2004
DE030-001	Blackbird Creek	Lower Blackbird	4a	Tidal segment from Route 13 to mouth of the Delaware River	13.8 miles	DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						Bacteria	NPS	2002	2006	2006	4a	2008	
DE030-002	Blackbird Creek	Upper Blackbird	5	Nontidal segment from headwaters to Route 13	13.6 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	1	2008	DO, listed 1996, delisted 2008
						Nutrients	NPS	1996	2006	2006	4a	2008	
				First eastern tributary after the headwaters to the confluence with Blackbird Creek	2.19 miles	Biology	NPS	1998	2011		5		
				Upper Blackbird Creek--from the confluence of the headwaters to the confluence with Barlow Branch	2.11 miles	Biology	NPS	1998	2011		5		
				From the confluence of the headwaters to the confluence with Barlow Branch	2.27 miles	Biology	NPS	1998	2011		5		
DE030-003	Blackbird Creek	Tributaries on the mainstem	5	Sandom Branch to the confluence with Blackbird Creek (upper half)	1.16 miles	DO	NPS	2004	2006	2006	4a	2008	
						Nutrients	NPS	2006	2006	2006	4a	2008	
						Bacteria	NPS	2006	2006	2006	4a	2008	
						Biology and Habitat	NPS	1998	2011		5		

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DE310-001	Smyrna River	Lower Smyrna River	4a	From the head of tide to the Delaware River	10.2 miles	DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						Bacteria	NPS	2002	2006	2006	4a	2008	
DE310-002	Smyrna River	Mill Creek	5	From the headwaters to Lake Como	5.2 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	2002	2006	2006	1	2008	DO, listed 2002, delisted 2008
				Providence Creek--from the confluence of the headwaters of Mill Creek to the confluence with Lake Como	2.18 miles	Biology and Habitat	NPS	1998	2011		5		
DE310-003	Smyrna River	Tributary of Smyrna River	5	Tributaries from the headwaters to the confluence with Delaware Bay	4.2 miles	Bacteria	NPS	1998	2006	2006	4a	2008	
						DO	NPS	2004	2006	2006	4a	2008	
						Nutrients	NPS	1998	2006	2006	4a	2008	
				From the confluence of the headwaters of Paw Paw Branch to the confluence with Providence Creek	2.68 miles	Biology and Habitat	NPS	1998	2011		5		
				First eastern tributary after the headwaters of Paw Paw Branch to the confluence with Smyrna River	0.86 miles	Habitat	NPS	1998	2011		5		
				Eastern tributary of the headwaters of Sawmill Branch to its confluence	0.67 miles	Biology and Habitat	NPS	1998	2011		5		
				Sawmill Branch--from the confluence of the headwaters to the next larger stream order	3.81 miles	Biology	NPS	1998	2011		5		
DE310-L01	Smyrna River	Lake Como and Duck Creek Pond	4a	Lake Como in Smyrna	82.0 acres	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	2006	2006	2006	4a	2008	
DE160-001	Leipsic River	Lower Leipsic River	4a	From dam at Garrisons Lake to mouth at Delaware River	13.6 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
DE160-002	Leipsic River	Upper Leipsic River	5	From headwaters to Garrisons Lake, excluding Masseys Mill Pond	5.8 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
				From the start of the third order stream on Pinks Branch to the confluence with	2.70 miles	Biology	NPS	1998	2011		5		
						DO	NPS	1998	2006	2006	4a	2008	
				Tributary of Leipsic River--from the confluence of the headwaters to the confluence with Leipsic River	0.93 miles	Biology	NPS	1998	2011		5		
DE160-003	Leipsic River	Tributary from the dam at Garrisons Lake to mouth at Delaware Bay	5	From the confluence of the headwaters of Alston Branch to the confluence Leipsic River	2.16 miles	Biology	NPS	1998	2011		5		
				Tributary of Leipsic River--eastern tributary of the headwaters to its confluence	0.91 miles	Habitat	NPS	1998	2011		5		
		Dyke Branch	4a	Dyke Branch from headwaters to confluence with Leipsic River	4.39 miles	DO	NPS	2004	2006	2006	4a	2008	
						Nutrients	NPS	2006	2006	2006	4a	2008	
						Bacteria	NPS	2006	2006	2006	4a	2008	
DE160-004	Leipsic River	Muddy Branch	4a	Muddy Branch from headwaters to the	5.59	DO	NPS	2004	2006	2006	4a	2008	
						Nutrients	NPS	2006	2006	2006	4a	2008	

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				confluence with Leipsic River	miles	Bacteria	NPS	2006	2006	2006	4a	2008	

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DE160-L01	Leipsic River	Garrisons Lake	4a	Lake south of Smyrna	85.9 acres	Bacteria	NPS	1996		2006	1	2006	Bacteria, Listed 1996, delisted 2006
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	2002	2006	2006	4a	2008	
DE160-L02	Leipsic River	Masseys Mill Pond	4a	Pond south of Clayton	30.0 acres	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
DE190-001-01	Little River	Lower Little River	4a	From the confluence of Upper Little River and Pipe Elm Branch with the Lower Little River to the mouth at	2.9 miles	DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						Bacteria	NPS	2002	2006	2006	4a	2008	
DE190-001-02	Little River	Upper Little River	5	From the headwaters to the confluence with Lower Little River	5.5 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
				Morgan Branch--from the confluence of the headwaters to the confluence with the next larger stream order	0.60 miles	Habitat	NPS	1998	2011		5		
				Start of the third order stream near the headwaters of Little River to the confluence with Morgan Branch	4.14 miles	Biology and Habitat	NPS	1998	2011		5		
DE190-001-03	Little River	Pipe Elm Branch	4a	From the headwaters to the confluence with Little River	2.1 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
DE290-001-01	Saint Jones River	Lower Saint Jones	5	From Old Lebanon Bridge to the mouth of Delaware Bay	8.3 miles	DO	NPS	1996	2006	2006	4a	2008	
						PCBs	NPS	1996	2011		5		
						Nutrients	NPS	1996	2006	2006	4a	2008	
						Bacteria	NPS	2002	2006	2006	4a	2008	
						Dioxin	NPS	2002	2011		5		
						Mercury	NPS	2002	2011		5		
						Arsenic	NPS	2002			1	2006	Not a contaminant of concern in fish consumption advisories for these waters
DE290-001-02	Saint Jones River	Upper Saint Jones	5	From the dam at Silver Lake to Old Lebanon Bridge at Road 357	6.7 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						PCBs	NPS	1996	2011		5		
						Nutrients	NPS	1996	2006	2006	4a	2008	
						Dioxin	NPS	2002	2011		5		
						Mercury	NPS	2002	2011		5		
						Arsenic	NPS	2002			1	2006	Not a contaminant of concern in fish consumption advisories for these waters
				Tributary of Silver Lake in Dover	0.32 miles	Habitat	NPS	1998	2011		5		
				Puncheon Branch--from the confluence of the headwaters to the confluence with the Saint Jones River	1.84 miles	Biology and Habitat	NPS	1998	2011		5		

WATERBODY ID	WATERSHED NAME	SEGMENT	Overall CALM Code	DESCRIPTION	SIZE	POLLUTANT OR STRESSOR	PROBABLE SOURCE(S)	YEAR LISTED	TARGET DATE FOR TMDL	TMDL DATE	Pollutant CALM Code	Year Changed from Category 5 Per 305(b) Assessment and Methodology	Notes
DE290-002	Saint Jones River	Isaac Branch	5	From the headwaters to the confluence with Saint Jones River, excluding Moores Lake	9.1 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO		1996		2006	1	2002	DO, listed in 1996, delisted 2002
				From the confluence of Allabands Mill Stream to the confluence with Saint Jones River	3.62 miles	Biology	NPS	1998	2011		5		
				From the confluence of the headwaters of Almhouse Branch to the confluence of Isaac Branch	2.50 miles	Biology	NPS	1998	2011		5		
				Second tributary upstream of Wyoming Lake on Isaac Branch	1.28 miles	Habitat	NPS	1998	2011		5		
				Wyoming Mill Pond	28.5 Acres	PCB	NPS	2002	2011		5		
						Dioxin	NPS	2002	2011		5		
						DDT	NPS	2002	2011		5		
DE290-003	Saint Jones River	Fork Branch	5	From the headwaters to Silver Lake in Dover	7.7 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
				Cahoon Branch--from the confluence of the headwaters to the confluence with the next larger stream order	2.33 miles	Habitat	NPS	1998	2011		5		
				Maidstone Branch- from the confluence of the third order stream to the confluence with Cahoon Branch	3.09 miles	Biology	NPS	1998	2011		5		
				Tributary to Maidstone Branch---from the confluence of the headwaters to the confluence with Maidstone Branch	0.13 miles	Habitat	NPS	1998	2011		5		
				Fork Branch--from the start of the third order stream to the confluence with	6.24 miles	Habitat	NPS	1998	2011		5		
						DO	NPS	1998	2011	2006	4a	2008	
				From the start of the third order stream on Cahoon Branch to the confluence with Maidstone Branch	1.28 miles	Biology	NPS	1998	2011		5		

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WATERBODY ID	WATERSHED NAME	SEGMENT	Overall CALM Code	DESCRIPTION	SIZE	POLLUTANT OR STRESSOR	PROBABLE SOURCE(S)	YEAR LISTED	TARGET DATE FOR TMDL	TMDL DATE	Polllutant CALM Code	Year Changed from Category 5 Per 305(b) Assessment and Methodology	Notes
DE290-004	Saint Jones River	Tidbury Branch	5	From below Derby Pond to the confluence with the Saint Jones River	3.8 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO		2002	2006	2006	4a	2008	
				From the confluence of the headwaters of Tidbury Creek to the confluence with Derby Pond	1.08 miles	Biology and Habitat	NPS	1998	2011		5		
				Tributary of Tidbury Creek--from the headwaters to the confluence with Tidbury Creek	0.75 miles	Habitat	NPS	1998	2011		5		
				Red House Branch--from the confluence of the headwaters to the confluence with Derby Pond	0.71 miles	Biology	NPS	1998	2011		5		
				Tidbury Creek--from the confluence with Derby Pond to the confluence with Lower Saint Jones River	4.53 miles	Biology	NPS	1998	2011		5		
DE290-L01	Saint Jones River	Moores Lake	5	Lake east of Camden	27.1 acres	Bacteria	NPS	1996	2006	2006	1	2008	Bacteria, listed 2006, delisted 2008
						PCBs	NPS	1996	2011		5		
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	1	2002	DO, listed in 1996, delisted 2002
						DDT	NPS	2002	2011		5		
DE290-L02	Saint Jones River	Silver Lake	5	Silver Lake at Dover	157.8 acres	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						PCBs	NPS	1996	2011		5		
						Dioxin	NPS	2002	2011		5		
						Mercury	NPS	2002	2011		5		
DE290-L03	Saint Jones River	Derby Pond	4a	Pond south of Wyoming	23.1 acres	Bacteria	NPS	1996		2006	1	2004	Bacteria, listed in 1996, delisted 2004
						Nutrients	NPS	1996	2006	2006	4a	2008	
DE220-001	Murderkill River	Lower Murderkill	4a	From the confluence with Spring Creek to the mouth at Delaware Bay	7.6 miles	Nutrients	PS, NPS	1996	2006	2001	4a	2004	
						DO	PS, NPS	1996	2006	2001	4a	2004	
						Bacteria	PS, NPS	2002	2006	2006	4a	2008	
DE220-002	Murderkill River	Spring Creek	5	From the headwaters to the confluence with Murderkill River , excluding Andrews Lake and McGinnis Pond	15.8 miles	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						DO	PS, NPS	1996		2001	4a	2004	
						Nutrients	PS, NPS	1996		2001	4a	2004	
				Tributary of Hudson River--from the headwaters to the confluence with the next larger stream order	0.49 miles	Biology and Habitat	NPS	1998	2011		5		
				Pratt Branch--eastern tributary of the headwaters to its confluence	1.27 miles	Biology	NPS	1998	2011		5		

WATERBODY ID	WATERSHED NAME	SEGMENT	Overall CALM Code	DESCRIPTION	SIZE	POLLUTANT OR STRESSOR	PROBABLE SOURCE(S)	YEAR LISTED	TARGET DATE FOR TMDL	TMDL DATE	Pollutant CALM Code	Year Changed from Category 5 Per 305(b) Assessment and Methodology	Notes
DE220-003	Murderkill River	Mid Murderkill River	5	From McCauley and Coursey Pond to the confluence with Spring Creek	9.2 miles	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						Nutrients	PS, NPS	1996		2001	4a	2004	
				Ash Gut-- from the headwaters to the confluence with the next larger stream order	1.04 miles	Biology and Habitat	NPS	1998	2011		5		
DE220-004	Murderkill River	Browns Branch	5	From the headwaters adjacent to Harrington to the confluence with McCauley Pond	8.8 miles	Bacteria	NPS	1998	2006	2006	4a	2008	
						DO	NPS	1998		2001	1	2008	DO, listed 1996, delisted 2008
						Nutrients	NPS	1998		2001	4a	2004	
						Ammonia	PS, NPS	2004		2001	4a	2004	
				Tributary of Browns Branch-- from the confuence of the headwaters wtot he confluence with Browns Branch	1.77 miles	Biology and Habitat	NPS	1998	2011		5		
DE220-005	Murderkill River	Upper Murderkill River	5	From the headwaters to the confluence with Coursey pond, excluding Killens and Coursey Ponds	7.4 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	2004		2001	1	2006	DO, listed in 2004, delisted 2006
						Nutrients	NPS	1996		2001	4a	2004	
				Spring Branch--tributary on Coursey Pond	2.52 miles	Biology	NPS	1998	2011		5		
				Fan Branch--from the headwaters to the confluence with Murderkill River	2.31 miles	Habitat	NPS	1998	2011		5		
						DO	NPS	1998	2011		5		
						Temperature	NPS	1998	2011		5		
				Tributary of Black Swamp Creek--from the headwaters to its confluence	0.28 miles	Habitat	NPS	1998	2011		5		
				Beaver Dam Branch--from the confluence of the headwaters to the confluence with Murderkill River and Black Swamp Creek	2.96 miles	Biology	NPS	1998	2011		5		
				Black Swamp Creek--from the headwaters of Black Swamp to the confluence with the next larger stream	0.75 miles	Biology and Habitat	NPS	1998	2011		5		
						DO	NPS	1998	2011		5		
DE220-L01	Murderkill River	McGinnis Pond	4a	Pond east of Viola	31.3 acres	Bacteria	NPS	1998		2006	1	2006	Bacteria, listed in 1998, delisted 2006
						Nutrients	NPS	1998		2001	4a	2004	
						DO	NPS	2002		2001	1	2008	DO, listed 2002, delisted 2008
DE220-L02	Murderkill River	Andrews Lake	4a	Pond West of Frederica	17.5a cres	Bacteria	NPS	2002	2006		1	2006	Bacteria, listed in 2002, delisted 2006
						Nutrients	NPS	2002		2001	4a	2004	
DE220-L03	Murderkill River	Coursey Pond	4a	Pond southwest of Frederica	58.1 acres	Nutrients	NPS	1996		2001	4a	2004	
						Bacteria	NPS	2002			1	2004	Bacteria, listed in 2002, delisted 2004

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DE220-L04	Murderkill River	Killens Pond	4a	Pond southwest of Felton	75.1 acres	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996		2001	4a	2004	
DE220-L05	Murderkill River	McCauley Pond	4a	Pond northeast of Harrington	49.0 acres	Bacteria	NPS	1996			1	2004	Bacteria, listed in 1996, delisted 2004
						Nutrients	NPS	1996		2001	4a	2004	
DE210-001	Mispillion River	Lower Mispillion	4a	From dam at Silver Lake to mouth at Delaware Bay	13.2 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
DE210-002	Mispillion River	Upper Mispillion	5	From the headwaters to Silver Lake in Milford, excluding Silver, Haven, and Griffith Lakes; Blairs, Abbotts, and Tub	11.2 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996		2006	1	2006	DO, listed 1996, delisted 2006
						Nutrients	NPS	1996	2006	2006	4a	2008	
				Tantrough Branch--from the headwaters to the confluence with Blairs Pond	3.24 miles	Biology	NPS	1998	2011		5		
				Beaverdam Branch--western tributary of the headwaters to its confluence	2.69 miles	Biology	NPS	1998	2011		5		
DE210-003	Mispillion River	Johnson Branch including its tributaries	5	Johnson Branch--from the confluence of the headwaters to the confluence with Haven Lake	4.02 miles	Habitat	NPS	1998	2011		5		
						Bacteria	NPS	2006	2006	2006	4a	2008	
						Nutrients	NPS	2006	2006	2006	4a	2008	
DE210-004	Mispillion River	Tributary from the headwaters to Silver Lake	5	Lednum Branch---eastern tributary of the headwaters to its confluence	1.31 miles	Habitat	NPS	1998	2011		5		
						Bacteria	NPS	2006	2006	2006	4a	2008	
						Nutrients	NPS	2006	2006	2006	4a	2008	
DE210-005	Mispillion River	Mispillion Tributaries From Dam At Silver Lake	4a	King's Causeway Branch	2.45 miles	DO	NPS	2004	2006	2006	4a	2008	
						Bacteria	NPS	2006	2006	2006	4a	2008	
						Nutrients	NPS	2006	2006	2006	4a	2008	
DE210-L01	Mispillion River	Tub Mill Pond	4a	Pond north of Milford	4.8 acres	Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	2006	2006	2006	1	2008	DO, listed 2006, delisted 2008
DE210-L02	Mispillion River	Silver Lake	4a	Silver Lake at Milford	28.5 acres	Bacteria	NPS	1996			1	2006	Bacteria, listed 1996, delisted 2006
						Nutrients	NPS	1996	2006	2006	4a	2008	
DE210-L03	Mispillion River	Haven Lake	4a	Lake west of Milford; upstream of Silver Lake	82.5 acres	Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996		2006	1	2006	DO, listed 1996, delisted 2006
						Bacteria	NPS	2002		2006	1	2004	Bacteria, listed in 2002, delisted 2004
DE210-L04	Mispillion River	Griffith Lake	4a	Lake west of Milford; upstream of Haven Lake	32.2 acres	Nutrients	NPS	1996	2006	2006	4a	2008	
DE210-L05	Mispillion River	Blairs Pond	4a	Pond southwest of Milford	28.5 acres	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO		1996		2006	1	2002	DO, listed in 1996, delisted 2002
DE210-L06	Mispillion River	Abbotts Mill Pond	4a	Pond southwest of Milford	25.6 acres	Bacteria	NPS	1998		2006	1	2006	Bacteria, listed 1998, delisted 2006
						Nutrients	NPS	1998	2006	2006	4a	2008	
						DO	NPS	2002	2006	2006	4a	2008	
DE080-001	Cedar Creek	Lower Cedar Creek	4a	Tidal segment from Cedar Creek Mill Pond to mouth at Delaware Bay	8.8 miles	DO	NPS	1996	2006	2006	4a	2008	
						Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	

WATERBODY ID	WATERSHED NAME	SEGMENT	Overall CALM Code	DESCRIPTION	SIZE	POLLUTANT OR STRESSOR	PROBABLE SOURCE(S)	YEAR LISTED	TARGET DATE FOR TMDL	TMDL DATE	Pollutant CALM Code	Year Changed from Category 5 Per 305(b) Assessment and Methodology	Notes
DE080-002	Cedar Creek	Upper Cedar Creek	4a	From the headwaters to Cedar Creek Mill Pond, including Church Branch and Cedar Mill Pond, Cubbage Pond,	13.0 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	2004	2006	2006	4a	2008	
DE080-003	Cedar Creek	Slaughter Creek	4a	From the headwaters to The Confluence with Cedar Creek	7.91 Miles	DO	NPS	2004	2006	2006	4a	2008	
						Nutrients	NPS	2006	2006	2006	4a	2008	
						Bacteria	NPS	2006	2006	2006	4a	2008	
DE060-001	Broadkill River	Lower Broadkill	4a	From the confluence with Beaver Dam Creek to mouth at Delaware Bay, excluding Red Mill Pond	8.1 miles	Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Bacteria	NPS	2002	2006	2006	4a	2008	
DE060-002	Broadkill River	Beaverdam Creek	4a	From the headwaters to the confluence with Broadkill River	8.3 miles	Bacteria	PS, NPS	1996	2006	2006	4a	2008	
						Nutrients	PS, NPS	1996	2006	2006	4a	2008	
						DO	PS, NPS	2002	2006	2006	1	2008	DO, listed 2002, delisted 2008
DE060-003	Broadkill River	Upper Broadkill River	5	Broadkill River from below Waggamons Pond to the confluence with Beaver Dam Creek	5.0 miles	Bacteria	PS, NPS	1998, 2006	2006	2006	4a	2004	Bacteria, listed in 1998, delisted 2004 , relisted 2006
						Nutrients	PS, NPS	1998	2006	2006	4a	2008	
						DO	PS, NPS	2006	2006	2006	4a	2008	
DE060-004	Broadkill River	Round Pole Branch	4a	Tributary from the headwaters to confluence with Upper Broadkill River	5.2 miles	Bacteria	NPS	1996		2006	4a	2008	Bacteria, listed 1996, delisted 2006, relisted 2008
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
DE060-005	Broadkill River	Ingrams Branch	4a	From the headwaters to Waggamons Pond, including Diamond Pond	7.6 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
				Ingrams Branch-- western tributary of the headwaters	1.70 miles	DO	NPS	1998	2006	2006	4a	2008	
						Habitat	NPS	1998	2012	2006	4a	2008	
DE060-006	Broadkill River	Pemberton Branch	4a	From the headwaters to Waggamons Pond	5.0 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						Nutrients	NPS	1996	2006	2006	4a	2008	
DE060-007-01	Broadkill River	Lower Red Mill Branch	4a	From Red Mill Pond to the confluence with Lower Broadkill River	5.3 miles	Nutrients	NPS	1996	2006	2006	4a	2008	
						DO		1996		2006	1	2002	DO, listed in 1996, delisted 2002
						Bacteria	NPS	2002		2006	1	2004	Bacteria, listed in 2002, delisted 2004
DE060-007-02	Broadkill River	Martin Branch	5	From the headwaters to Red Mill Pond	1.5 miles	DO	NPS	1996		2006	1	2006	DO, listed in 1996, delisted 2006
						Nutrients	NPS	1996	2006	2006	4a	2008	
						Bacteria	NPS	2006	2006	2006	4a	2008	
				Tributary above Red Mill Pond--from start of the second order stream to the confluence with Red Mill Pond	0.06 miles	Habitat	NPS	1998	2011		5		
DE060-007-03	Broadkill River	Heronwood Branch	4a	From the headwaters to Red Mill Pond	1.0 miles	Bacteria	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	4a	2008	
DE060-L01	Broadkill River	Red Mill Pond	4a	Pond located on Martin Branch	150.0 acres	Bacteria	NPS	1996		2006	1	2006	Bacteria , listed in 1996, delisted 2006
						Nutrients	NPS	1996	2006	2006	4a	2008	
						DO	NPS	1996	2006	2006	1	2008	DO, listed 1996, delisted 2008
DE060-L02	Broadkill River	Waggamons Pond	4a	Pond adjacent to Milton	35.0 acres	Nutrients	PS, NPS	1996	2006	2006	4a	2008	

Table III-7 Delaware 2008 303(d) list

WATERBODY ID	WATERSHED NAME	SEGMENT	Overall CALM Code	DESCRIPTION	SIZE	POLLUTANT OR STRESSOR	PROBABLE SOURCE(S)	YEAR LISTED	TARGET DATE FOR TMDL	TMDL DATE	Pollutant CALM Code	Year Changed from Category 5 Per 305(b) Assessment and Methodology	Notes
DE060-L03	Broadkill River	Waples Pond and Reynolds Pond	4a	Ponds located on Sowbridge Branch of Primehook Creek	88.8 acres	Bacteria	NPS	1998		2006	1	2006	Bacteria , listed in 1998, delisted 2006
						Nutrients	NPS	1998	2006	2006	4a	2008	
						DO	NPS	1998		2006	1	2006	DO, listed 1998, delisted 2006

WATERBODY ID	WATERSHED NAME	SEGMENT	Overall CALM Code	DESCRIPTION	SIZE	POLLUTANT OR STRESSOR	PROBABLE SOURCE(S)	YEAR LISTED	TARGET DATE FOR TMDL	TMDL DATE	Pollutant CALM Code	Year Changed from Category 5 Per 305(b) Assessment and Methodology	Notes
DELAWARE ESTUARY BASIN													
N/A	Delaware Bay	DRBC Zone 6	5	From Liston Point to the confluence with the Atlantic Ocean	782.0 sq. mi.	Bacteria	PS, NPS	1996			1		Bacteria , listed in 1996, delisted 2004 based on 2004 DRBC 305(b) assessment
						PCBs	PS, NPS, SF	1996	2005	2006	4a	2008	
						Mercury		2002	2012		5		
						Dioxin		2002			1	2006	Not a contaminant of concern in fish consumption advisories for these waters
KEY for Pollutant(s) or Stressor(s):													
	DO = Dissolved Oxygen												
KEY for Probable Source(s):													
	NPS = Nonpoint Source(s)												
	PS = Point Source(s)												
	SF = Superfund Site(s)												
KEY for CALM Code													
1= Fully Supporting for this parameter													
3= Information is insufficent to make a determination													
4a= TMDL has been completed and approved by EPA													
4b= Management Actions are expected to solve impairment													
5= TMDL Needed													

Chapter Four: Public Health/Aquatic Life Concerns

State of Delaware Fish Consumption Advisory Update

Certain chemicals build up in the food chain to levels that can be harmful to human and ecological health. DNREC and DHSS collect and analyze fish from Delaware waters to monitor the extent that these chemicals accumulate in fish from Delaware waters. When elevated levels are detected, the information is shared with the public and consumption advisories are issued to notify the angling public, their families, and friends regarding contaminants in fish from affected waterways. The advisories include specific advice on the number of meals to be consumed annually and proper trimming and cooking. The goal of this advice is voluntary reduction of exposure until the contamination is sufficiently cleaned up.

The following table lists the current fish consumption advisories (recommended limitations on the consumption of particular fish species) issued jointly by the Delaware Department of Natural Resources and Environmental Control and the Department of Health and Social Services, as of 2007.

<table>
<tr><th colspan="5">2007 Delaware Fish Consumption Advisories</th></tr>
<tr><th colspan="5">Delaware Estuary and Tributaries</th></tr>
<tr><th>Waterbody</th><th>Species</th><th>Geographical Extent</th><th>Contaminants of Concern</th><th>Advice</th></tr>
<tr><td>Delaware River</td><td>All Finfish</td><td>Delaware State Line to the C&D Canal</td><td>PCBs, Dioxin, Mercury, Chlorinated Pesticides</td><td>No Consumption</td></tr>
<tr><td rowspan="2">Lower Delaware River and Delaware Bay</td><td>Weakfish-all sizes;
Bluefish-14 inches or less</td><td>Chesapeake & Delaware Canal to the Mouth of the Delaware Bay</td><td>PCBs</td><td>No more than one meal per month</td></tr>
<tr><td>Striped Bass
White Perch
American Eel
Channel Catfish
White Catfish
Bluefish- greater than 14</td><td>Chesapeake & Delaware Canal to the Mouth of the Delaware Bay</td><td>PCBs, Mercury</td><td>No consumption for women of childbearing age and children. All others, no more than one meal per year</td></tr>
</table>

	inches			
Shellpot Creek	All Finfish	Philadelphia Pike to the Delaware River	PCBs	No Consumption
Army Creek and Pond	All Finfish	Entire Creek and Pond	PCB, Dioxin/Furans, Dieldrin, Toxaphene	No more than two meals per year
Red Lion Creek	All Finfish	Route 13 to the Delaware River	PCBs, Dioxin	No more than one meal per year
Chesapeake & Delaware Canal	All Finfish	Entire Canal in Delaware	PCBs, DDT, Dieldrin, Chlordane	No Consumption
Appoquinimink River	All Finfish	Tidal Portions	PCBs, Dioxin	No more than one meal per year
Drawyers Creek	All Finfish	Tidal Portions	PCBs, DDT	No more than one meal per year
Silver Lake Middletown	All Finfish	Entire Lake	PCBs, Dieldrin, DDT, Dioxin	No more than one meal per year
Saint Jones River	All Finfish	River Mouth to Silver Lake Dam	PCBs, Dioxin, Mercury	No more than two meals per year
Moores Lake	All Finfish	Entire Pond	PCBs, DDT	No more than two meals per year
Silver Lake Dover	All Finfish	Entire Pond	PCBs, Dioxin, Mercury	No more than two meals per year
Wyoming Mill Pond	All Finfish	Entire Pond	PCBs, Dioxin, DDT	No more than two meals per year
Prime Hook Creek	All Finfish	Entire Creek	Mercury	Women of childbearing age and children should not eat more than one meal per month. All

				others, no more than two meals per month.
Waples Pond	All Finfish	Entire Pond	Mercury	Women of childbearing age and children should not eat more than one meal per month. All others, no more than two meals per month.
Slaughter Creek	All Finfish	Entire Creek	PCBs, Dioxin/Furans	No more than six meals per year

Christina Basin

Waterbody	Species	Geographical Extent	Contaminants of Concern	Advice
Tidal Brandywine River	All Finfish	River Mouth to Baynard Blvd.	PCBs	No Consumption
Non-tidal Brandywine River	All Finfish	Baynard Blvd. To Pennsylvania Line	PCBs, Dioxin	No more than two meals per year
Tidal Christina River	All Finfish	River Mouth to Smalley's Dam	PCBs, Dieldrin	No Consumption
Non-tidal Christina River	All Finfish	Smalley's Dam to DE/MD Line.	PCBs, Dieldrin, Chlordane	No more than six meals per year
Tidal White Clay Creek	All Finfish	River Mouth to Route 4	PCBs	No Consumption
Non-tidal White Clay Creek	All Finfish	Route 4 to DE/PA Line	PCBs	No more than one meal per month
Red Clay Creek	All Finfish	State Line to Stanton	PCBs, Dioxin, Chlorinated Pesticides	No more than two meals per year

Little Mill Creek	All Finfish	Creek Mouth to Kirkwood Highway	PCBs	No Consumption
Becks Pond	All Finfish	Entire Pond	PCBs, Mercury	No more than one meal per year

Stocked Trout				
Waterbody	**Species**	**Geographical Extent**	**Contaminants of Concern**	**Advice**
Christina Creek	Stocked Trout	Rittenhouse Park to DE/MD Line	PCBs, Dieldrin	No more than six meals per year
Designated Trout Streams and Ponds other than Christina Creek	Stocked Trout	Designated Trout Stocking Areas are listed in the Delaware 2006 Fishing Guide and at http://www.dnrec.state.de.us/fw/Trout/TroutMaps.htm	PCBs	No more than one meal per month

Delaware Atlantic Coastal Waters including Delaware Inland Bays				
Waterbody	**Species**	**Geographical Extent**	**Contaminants of Concern**	**Advice**
Delaware Atlantic Coastal Waters including Delaware Inland Bays	Bluefish-14 inches or less	Coastal Delaware from Mouth of the Delaware Bay Southward to MD/DE Line	PCBs	No more than one meal per month
	Bluefish-greater than 14 inches	Coastal Delaware from Mouth of the Delaware Bay Southward to MD/DE Line	PCBs, Mercury	No consumption for women of childbearing age and children. All thers, no more than one meal per year

Notes:

The pollutant listed first is of the greatest concern in this system.

Proper trimming and cooking of fish can reduce but not eliminate the risk associated with PCBs, dioxins, and chlorinated pesticides. Trimming and cooking does not reduce the risk associated with mercury.

The contaminant of primary concern for these advisories is polychlorinated biphenyl (PCB). To a lesser degree chlorinated pesticides, dioxins and mercury have been identified as contaminants of concern. PCBs have been designated as probable human carcinogens by the EPA, are believed to affect the immune system and have been linked to developmental problems in infants. PCBs were banned in the 1970s but are extremely persistent in the environment. PCBs are found in bottom sediments and continue to enter Delaware waters from upland sources, though not at an increasing rate. Data collected to date show that PCBs in fish are not an imminent public health threat, though they are a significant, avoidable exposure. Exposure may be avoided by eating fish from uncontaminated waters. Delaware will continue to monitor the situation and coordinate work between and within agencies to coordinate remediation activities.

National Methylmercury Fish Consumption Advisory

On January 12, 2001, EPA and the Food and Drug Administration (FDA) issued concurrent national fish consumption advisories recommending restricted consumption of freshwater coastal and marine species of fish due to methylmercury contamination. EPA's advisory targeted women of childbearing age and children who may be consuming noncommercial freshwater fish caught by family or friends. The advisory specifically recommends that women who are pregnant or could become pregnant, women who are nursing a baby, and their young children, should limit consumption of freshwater fish caught by family and friends to one meal per week unless the state health department has different advice for the specific waters where the fish are caught. For adults, one meal is six ounces of cooked fish or eight ounces uncooked fish; for a young child, one meal is two ounces of cooked fish or three ounces of uncooked fish.

The FDA issued advice on mercury in fish bought from stores and restaurants, which includes ocean and coastal fish as well as other types of commercial fish. The advice was that women who are pregnant or could become pregnant, nursing mothers, and young children, not eat shark, swordfish, king mackerel, or tilefish. FDA also advises that women who are pregnant or could become pregnant may eat an average of 12 ounces of fish purchased in stores and restaurants each week. EPA recommends that women who are or could become pregnant, nursing mothers, and young children follow the FDA advice for coastal and ocean fish caught by family and friends. EPA and FDA both recommend that the public check with state or local health authorities for specific consumption advice about fish caught or sold in the local area. The EPA and FDA advisories are available through the EPA fish advisory website.

Shellfish and Recreational Waters Program

Shellfish Program

Delaware, along with 26 other states, and nine foreign countries, is a member of the Interstate Shellfish Sanitation Conference (ISSC), administrative body of the National Shellfish Sanitation Program (NSSP). The ISSC is a tripartite organization, with the membership including state participants, the U.S. Food and Drug Administration, and the shellfish industry. Member-states / countries establish water quality and pollution source parameters for determining the safety of shellfish for human consumption. Additionally, parameters are established for sanitation in harvesting, processing, and shipping shellfish (molluscan bivalves).

DNREC's role is to maintain Delaware's NSSP conforming status, as per FDA scrutiny (annual Program evaluations), thereby allowing Delaware to ship and receive shellfish. This is necessary for the preservation of Delaware's shellfish industry. Additionally, and most importantly, this ensures a safe product for the shellfish consumer.

Recreational Water (beach monitoring) Program

DNREC also ensures that natural bathing beaches are safe for swimming. Of particular concern are viruses shed by humans. Delaware uses total enterococci as an indicator of possible human fecal contamination. As is the case with the Shellfish Program, there is a qualitative component in the assessment of the risk to swimmers. Enterococci in the presence of possible sources of human fecal contamination may represent an unacceptable health risk. However, there is an increasing body of evidence, including studies conducted in Delaware, that so-called indicator bacteria are ubiquitous in the environment. Delaware's standards are based on Delaware-specific bacteria and illness data, and reflect a threshold swimming advisory level of 12.5 illnesses per 1,000 swimmers. The actual prevailing risk may be in the range of two in 100,000. Guarded beaches are tested weekly from mid-May to Labor Day.

Part IV: Wetlands Assessment

Part IV: Wetlands Assessment

Introduction

Wetlands comprise a significant portion of the water resources of Delaware covering over 300,000 acres of the state. Throughout the state a wide diversity of wetland types occur including both tidal and nontidal wetlands. While some wetlands are directly connected or adjacent to other surface waters such as salt marshes and floodplains, others occur as isolated areas surrounded by uplands such as forested flats and Delmarva Bays. Preserving the abundance, quality, diversity and proportion of different types of wetlands in the landscape is essential to protecting the natural resources and waters of Delaware. Currently the State of Delaware is actively working in each of these areas to protect our high quality wetland resources and restore degraded systems on the watershed scale.

Functions and Values of Wetlands

Wetlands perform a variety of functions including surface and subsurface water exchange, surface and subsurface water storage, sediment retention, nutrient cycling, organic carbon export, providing faunal and flora habitat, maintaining intact food webs, and maintaining interspersion and connectivity in the landscape. Because wetlands are diverse and occur in a variety different ecosystems, they do not all perform the same functions therefore, it is generally difficult to determine a wetland's function without a specific site analysis. Variables to consider in assessing wetland function include: wetland type, landscape position, vegetation, soils, hydrology, size, adjacent land use, and human disturbance.

In contrast to function, wetland value is determined by the usefulness of the wetland and the functions it is performing to humans. According to Wohlgemuth (1991), wetlands offer three broad categories of values: fish and wildlife habitat values, environmental quality values and socioeconomic values. The location of the wetland, human pressures on it, or the size of the wetland may indicate the value of a functional ecological process (Mitch and Gosselink, 1986). For example, clean water associated with wetlands provides drinking water to upland species, and provides an uncontaminated environment necessary for many fish species, and ultimately, recreational value in the form of hunting and fishing for humans. Because wetland values are determined by their benefit to humans, a wetland in one locality may be more highly valued than a wetland performing the same function in another locality.

Fish and Wildlife Habitat

Wetlands provide food and habitat for a variety of terrestrial and aquatic species including fish, birds, mammals, amphibians, reptiles, and invertebrates. Some of these animals are either fully or partially dependent on wetlands to complete their lifecycles. Most Commercially important fish species, for example, are wholly dependent on wetlands for spawning and nursery areas. Wetlands also provide breeding, feeding, and nesting habitats for a variety of waterfowl species and furbearers. Some species of frogs, toads, and salamanders depend on wetland habitat for their survival, and provide food for animals in higher trophic levels. Reptiles, such as turtles and snakes, use these areas for the same reasons as the above. Invertebrates such as aquatic insects are important in the maintenance of the food web.

Environmental Quality Benefits

Wetlands are considered among the most productive ecosystems in the world. Wetland plants produce more plant material than most very productive cultivated farm fields. Wetland plant communities sustain a high diversity of plant species including a large number of rare and threatened species in Delaware. Additionally, when the plants die and are broken down into detritus by bacteria and other microorganisms, they form the base of the food web that supports higher animals such as commercial fish species. Wetlands also help maintain and improve water quality. The following are specific environmental quality benefits of wetlands:

Pollutant removal (heavy metals, pathogens)

Sediment trapping

Nutrient uptake and recycling

Oxygen production

Socioeconomic Values

Some of the functions that wetlands perform are economically valuable, such as protection from flood and storm damage. Because these benefits provide dollar savings, they tend to be more appreciated.

The following are some socioeconomic wetland values:

Flood and storm water damage protection

Erosion control

Water supply and ground water recharge

Natural products supply (e.g., timber, fish, wildlife, firewood… etc.)

Recreation (e.g., waterfowl, fishing, boating, nature study… etc.)

Wetland Quantity

Estimates of wetland acreages have changed as more technologically refined techniques have been developed over the last couple of years. Until the advent of this higher resolution color aerial infrared photography, it was found that much of the wetland land base was underestimated. In fact, previous estimates by Tiner (1985) assessed 221,800 total acres of tidal and nontidal wetlands in Delaware, while a recent estimate by the same author realized a more refined estimate of 353,868 (Tiner 2002). The higher figure reported in the latter estimate can, however, be attributed in part to the inclusion of 29,000 acres of nontidal agricultural wetlands that were intentionally omitted in the previous assessment effort (See table 1).

Table V-1. Current tidal and nontidal Delaware wetland acreage estimates (Tiner 2002).

Tidal wetlands	127,338

Nontidal wetlands*	226,530
Total wetland acreage	353,868

* Includes 29,000 acres of nontidal agricultural wetlands

I.2.1 The Statewide Wetland Mapping Project (SWMP) and Wetland Trends in Delaware (1981/2-1992)

In an attempt to improve existing wetland inventories, the State Wetlands Mapping Project (SWMP) was conceived as a collaborative effort between the Delaware Department of Natural Resources (DNREC), Delaware Department of Transportation (DELDOT), and the United States Fish and Wildlife Service (USFWS; Pomato 1994). Utilizing aerial color digital orthophotography, the SWMP maps (derived from same named project), employ a modified Cowardin et. al. (1979) hierarchical classification scheme for classifying Delaware's wetlands. These aerial color photographs provide higher level resolution "wetland signatures" than the older monochromatic National Wetlands Inventory (NWI) maps, which increases the precision and accuracy of wetland delineation, identification of vegetative types (e.g., broad-leaved deciduous, broad-leaved evergreen…etc), and the identification of hydrologic regimes (e.g., A, B, C…etc.).

Utilizing color infrared aerial photography for the decade-long time period (1981/2-1992), the service assessed statewide wetland losses, gains, and changes in wetland type by photo interpretation of "wetland signatures." Wetland trends were also assessed separately in the following four drainage basins: 1) Northern Piedmont, 2) Delaware Bay, 3) Chesapeake Bay and, 4) Inland Bays.

Statewide Wetland Losses (1981/2-1992)

Approximately 2000 acres of vegetated wetlands were destroyed from 1981/2 to 1992 time period. Most of the wetland losses were palustrine vegetated wetlands (1890 acres), while estuarine wetlands losses were minor. (106 acres; Tiner et al. 1999).

Agricultural activities had the greatest impact on Palustrine wetland losses (954 acres). Residential activities also destroyed significant amounts of wetlands (436 acres). The remaining wetland losses were derived from pond and road construction practices, with each being responsible for 7 percent of the losses. Palustrine vegetated wetlands accounted for 95 percent of all wetland losses in Delaware. Palustrine forested wetlands experienced the bulk of losses of all palustrine vegetated types (1505 acres; Tiner et al. 1999). Most of the losses to estuarine wetlands were due to saltwater impoundments (52.2 acres). Filling in wetlands also accounted for some significant acreage losses (32.7acres). Highway road projects and residential development accounted for the balance of estuarine wetland losses (11 acres; Tiner et al. 1999).

Northern Piedmont Drainage Wetland Losses

The Northern Piedmont drainage is the smallest and most urbanized drainage basin in the state. About 9 percent of the state's land area fall within this drainage basin, which contains approximately 3.2 percent of the state's wetlands.

During this decade-long study period (1981/2-1992), palustrine vegetated wetlands experienced the greatest losses. These wetland s declined by 137.8 net acres. Of all palustrine vegetated types, palustrine forested wetlands experienced the greatest losses, with about 110 acres or 75 percent of total palustrine vegetated wetland being converted to uplands. Residential and Industrial development were the leading causes attributed to their destruction of 70 percent and 18 percent, respectively. (Tiner et al. 1999).

Estuarine wetlands were not subject to the same degree of destruction as palustrine wetlands during the decade long study period. Approximately 1 acre of wetlands was destroyed by conversion to industrial development, or impounded estuarine deepwater habitat (Tiner et al. 1999).

Delaware Bay Drainage Wetland Losses

The Delaware Bay Drainage is the largest drainage in Delaware. About 41 percent of the state's land area fall within this drainage basin, which also contains approximately 34 percent of the state's wetlands. From 1981/2-1992, palustrine vegetated wetlands experienced the greatest losses (679.2 acres), though estuarine wetlands experienced lesser, though not insignificant losses (78.4 acres; Tiner et al. 1999).

The primary agent in palustrine vegetated wetland destruction was residential development, accounting for about 35 percent of the losses. Agriculture and Highway road construction accounted for the remainder of the losses – about 28 percent and 10 percent, respectively (Tiner et al. 1999).

From 1981/2-1992, estuarine wetlands experienced net losses only second to palustrine vegetated wetlands (78.4 acres). The primary cause of their losses was conversion to estuarine open water impoundments and dredged channels (36.8 acres), miscellaneous filling practices (37.4 acres; Tiner et al. 1999).

Chesapeake Bay Drainage

The Chesapeake Bay drainage is the second largest drainage in Delaware (approximately 32 percent), and contains the greatest percentage of wetlands (approximately 54 percent) of the four drainages. Palustrine vegetated wetlands are the predominant wetland system type found in this basin. About 712 acres of palustrine vegetated wetlands, or 84 percent of these wetlands, were lost due to agricultural expansion during the 1981/2-1992 study period. Significant acreages of estuarine vegetated wetlands are not found in this basin (Tiner et al. 1999).

Most of the palustrine vegetated wetland losses were palustrine forested wetlands. Approximately 701 acres of these wetlands were destroyed during the 1981/2-1992 study period. Agricultural operations were responsible for 82 percent of the losses of this wetland type (Tiner et al. 1999).

Inland Bays Drainage

The Inland Bays Drainage is comprised of three coastal bays: Indian River Bay, Rehoboth Bay, and Little Assawoman Bay. This drainage comprises about 18 percent of Delaware's surface land area and contains both Palustrine and Estuarine wetlands. Consistent with the other three drainages, Palustrine vegetated wetlands experienced the greatest losses (Tiner et al. 1999).

A loss of 271.3 acres of palustrine vegetated wetlands were recorded during the 1981/2-1992 time period, of which forty-eight percent were directly attributed to agricultural operations. The remainder of the losses were agricultural and residential – about 20 percent and 24 percent, respectively (Tiner et al. 1999).

Forested wetlands bore the brunt of these losses. About 254.3 acres of forested wetlands were lost during the 1980s, which represents 90 percent of the drainage's palustrine vegetated wetland base. Palustrine deciduous forests experienced the greatest losses, with 178.4 acres converted to uplands or 70 percent of the palustrine forested wetland base. Agricultural activities were responsible for 38 percent of the total losses. Residential development and pond construction accounted for remaining wetland losses, 33 percent and 26, respectively (Tiner et al. 1999).

Wetland Quality

In addition to evaluating the quantity of wetlands in the state and working towards protection of these areas, the State of Delaware is developing techniques to begin assessing the condition of our wetland resources. Beginning in 1999 we have been working with The Smithsonian Environmental Research Center and The Nature Conservancy in the Nanticoke River watershed to develop hydrogeomorphic models that will evaluate how non-tidal wetlands throughout the watershed are performing various functions compared to reference sites. This study will provide information on the overall condition of wetlands in the watershed and identify the major stressors that are affecting wetland functions. Currently we are completing this work and compiling the information with the goal of producing a strategy for wetland protection and restoration for the watershed that will improve wetland quality on the watershed level.

Wetlands and Total Maximum Daily Load (TMDL) Regulations

As noted above, wetlands processes can be important in the removal and mitigation of excessive sediment, nutrients, and other pollutants. These pollutants have a direct bearing on the quality of water in the receiving waterbody. Delaware has recently enacted TMDL regulations to improve water quality in waterbodies that are not meeting their designated uses. The Department believes active preservation and restoration of high quality wetlands will be important components of a successful TMDL implementation process.

References

Mitsch, W.J. and J.G. Gosselink. 1986. Wetlands. Van Nostrand Reinhold Co., New York, NY. 329 pp.

Pomato, L.T. 1994. Statewide Wetland Mapping Project (SWMP). Prepared for the State of Delaware's Department of Natural Resource and Environmental Control (DNREC) and for the Delaware Department of Transportation (DELDOT).

Tiner, R.J. 2002. Delaware Wetlands Status and Trends. In Press.

Tiner, R., J. Swords and S. Schaller 1999. Wetland Trends in Delaware 1981/2 to 1992. U.S. Fish and Wildlife Service, National Wetlands Inventory, Hadley, MA and Delaware Department of Natural Resources and Environmental Control, Watershed Assessment Section, Dover, DE. Cooperative Publication. 46pp.

Wohlgemuth, M., 1991. Non-tidal Wetland Functions and Values. Technical Report No. 91-A. 12 pp.

Wetland Condition in the Nanticoke River Watershed (Maryland and Delaware)

The Maryland Department of Natural Resources (MD DNR) and the Delaware Department of Natural Resources and Environmental Control (DNREC) along with the Smithsonian Environmental Research Center, The Nature Conservancy and multiple other public and private groups collaborated to assess the condition of freshwater nontidal wetlands in the Nanticoke watershed. The goal of this project was to obtain baseline information on the condition of these wetlands and to gain an understanding of the stressors that are impacting wetland condition to target wetland protection and restoration activities.

The condition of nontidal wetlands in the Nanticoke River watershed was assessed using a probabilistic sampling design developed by EPA Ecological Monitoring and Assessment Program (EMAP). This approach allowed us to correct for biases due to access to sites and extrapolate the sample results to the entire population of wetlands in the watershed. We gained access to 67% of the privately owned sites to sample a total of 191 sites (54 riverine sites in 1999 and 2000, 89 flats in 2000 and 48 depressions in 2003). Additionally, we sampled 2 farmed wetlands and 4 excavated wetlands that were selected by EMAP but were not part of the target population and 29 restored wetlands that were randomly selected based on an inventory of restoration projects.

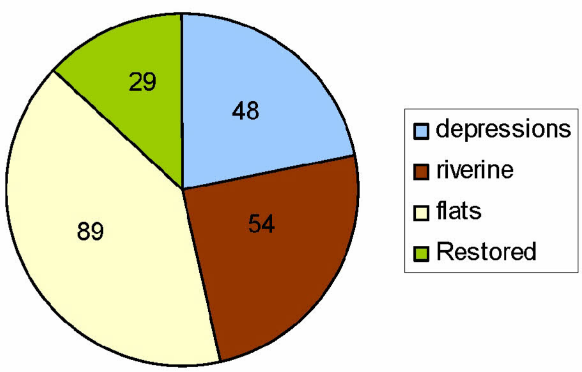

Figure 1 – number of random wetland sites sampled in the Nanticoke River watershed

Hydrogeomorphic (HGM) models were used to assess 5 functions for flat, riverine, and depressional wetlands.

> Maintenance of characteristic hydrology – the ability of a site to maintain typical water level fluctuations as compared reference sites of similar wetland type. Hydrology is the driver behind all other wetland functions and determines the capacity of a wetland to perform these functions.

Biogeochemical cycling and storage – the ability of a wetland to perform biological and chemical processes such as nutrient cycling, carbon sequestration, and sediment storage as compared to reference sites of similar wetland type.

Plant community integrity – the ability of a wetland to support characteristic native vegetation as compared to reference sites of similar wetland type. The plant community in turn supports other processes and ecosystem services such as wildlife habitat, nutrient cycling and biodiversity.

Wildlife habitat integrity – the ability of a site to support characteristic wildlife species as determined by the structure of the vegetation and other physical characteristics of the site.

Buffer integrity – the condition of the adjacent habitat surrounding the wetland. Buffers in better condition provide protection of the wetland from stressors that can degrade all other functions and also provide linkages to other habitats such as uplands and streams to connect animal and plant populations and sustain processes that span large areas such as removal of nutrients.

HGM functions are composed of variables that are scaled to reference conditions in the Nanticoke River watershed and surrounding areas. Additionally, an index of wetland condition (IWC) was calculated that combines the strongest variables to produce an overall score of condition. Breakpoints in the IWC scores were determined to categorize sites into three condition classes: minimally or not stressed, moderately stressed, and highly stressed. To provide wetland protection and restoration recommendations, we used general patterns of wetland condition based on the scores of multiple functions at a site.

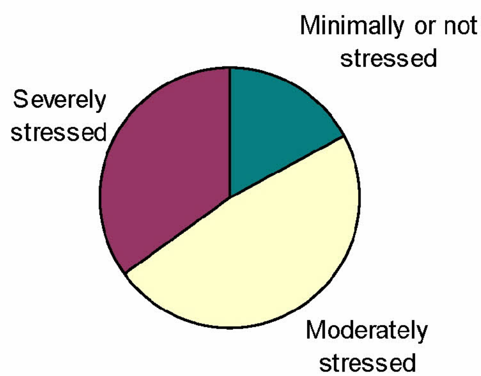

Figure 2. Condition of nontidal wetlands in the Nanticoke River watershed as determined by the Index of wetland condition

Overall, 17% of the nontidal wetlands in the Nanticoke River watershed are considered minimally or not stressed based on the IWC, 48% were moderately stressed and 35% were highly stressed. All wetland types had a low percent that were minimally altered for both hydrology and vegetation (16% of the riverine wetland area, 8% of flat wetland area, and 6% of depressions) indicating the need to prioritize protection efforts on the few minimally impacted wetlands that remain.

Flats are the dominant wetland type comprising 71% of the wetlands in the watershed. Fifteen percent of flats were minimally or not stressed and 34% were highly stressed. The average functional scores varied with the plant community integrity having the lowest of 51% of reference condition whereas the buffer integrity function was performing the best at 90% of reference condition. The average wildlife habitat function score was 63 and the average plant community integrity function score was 50. Dominant stressors impacting wetlands and lowering condition were hydrology alterations due to ditching and vegetative alterations due to forestry practices, which alter species structure and composition.

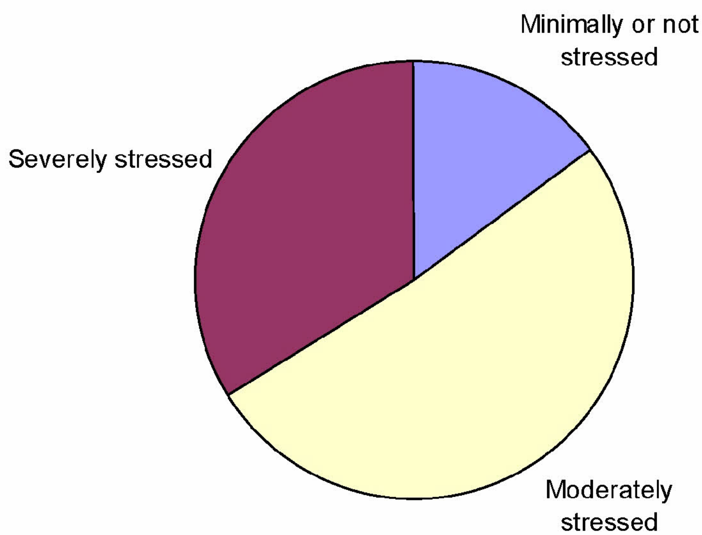

Figure 3. Condition of flat wetlands in the Nanticoke River watershed as determined by the Index of Wetland Condition.

Within flat wetlands, 58% of the wetland area has species composition and vegetative structure alterations that was not related to hydrologic alterations. Many of the vegetative alterations are due to the conversion of the native mixed hardwood forests to loblolly pine plantations, which alters species composition and structure of the vegetation community. Restoration for the flats subclass should focus on restoring a native vegetative community with a hydrology that is sustainable given current landscape level alterations. Enhancement of existing wetlands and re-establishment of former wetlands should focus on improving and increasing areas within and adjacent to large forest blocks.

The IWC for riverine wetlands averaged 69 with 30% of the riverine wetlands considered minimally or not stressed and 25% highly stressed. Biogeochemical cycling was functioning the lowest at an average of 45% of reference while the plant community integrity had the highest average function of 84. The wildlife habitat integrity and plant community integrity were functioning at higher levels compared to the flats because of lower incidence of direct alteration by agrictulture, forestry, and development. The dominant stressor to riverine wetlands was hydrologic alteration due to stream channelization. In the watershed, 86% of the nontidal streams are either channelized or ditched.

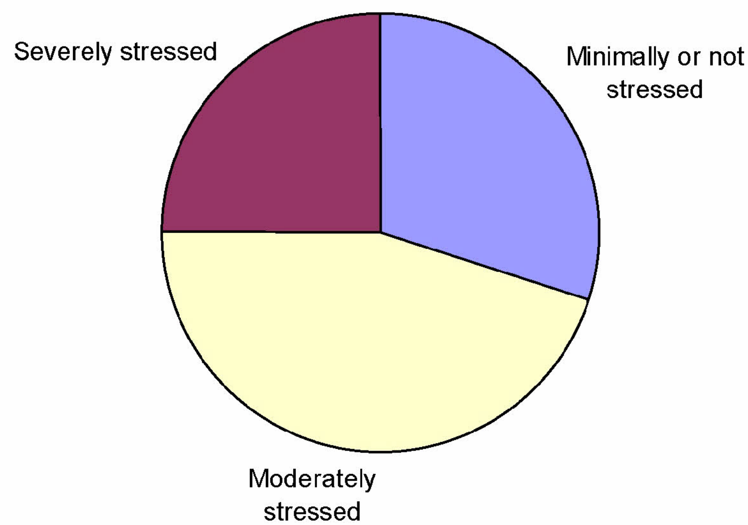

Figure 4. Condition of riverine wetlands in the Nanticoke River watershed as determined by the Index of Wetland Condition

The hydrology of 80% of the area of riverine wetlands is impacted primarily by channelization of streams, road crossings and dams. Of the riverine wetlands that had hydrologic impacts, 61% of these areas also had vegetative alterations. However, if the hydrology of the wetlands remained intact, only 4% of the wetlands had vegetative alterations. Therefore, riverine wetland restoration should focus foremost on hydrologic improvements. Sites that do not have species composition alterations (33%) should be targeted first to restore the hydrology before species composition shifts occur or non-native and invasive species become established.

Depressions had that highest levels of degradation compared to reference. They had an average IWC of 62 with only 22% of the wetlands minimally or not stressed and 44% highly stressed. The functions of depressions are significantly altered from reference standard condition with the average function values ranging from 58 for plant community integrity to 70 for buffer integrity. These low scores compared to reference standard condition for all functions are due to multiple stressors that are impacting depressions and affecting all parts of the system.

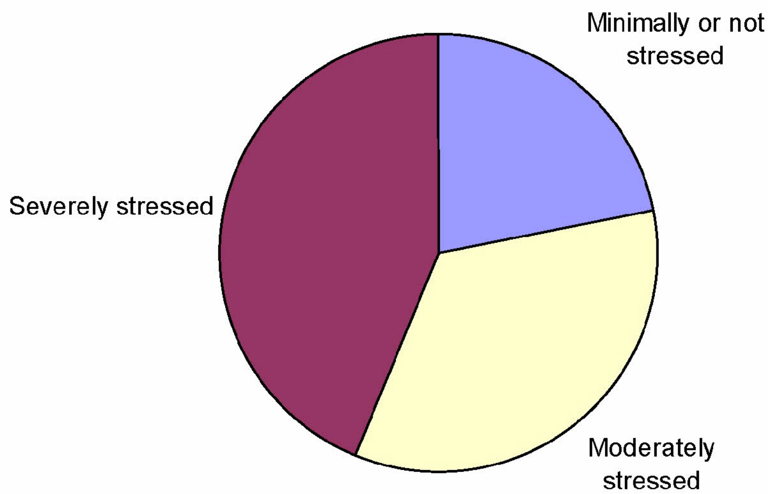

Figure 5. Condition of depressional wetlands in the Nanticoke River watershed as determined by the Index of Wetland Condition

Depressions have the highest levels of hydrologic and vegetative stressors and thus lowest condition of non-tidal wetlands in the watershed. Forty-two percent of the wetlands had altered hydrology and vegetative structure, and species composition shifts. Many of these wetlands are impacted by major stressors such as excavation, plowing, or extensive ditching. Restoration of depressional wetlands should be targeted on an individual site basis and within a larger landscape context to support the unique amphibian and bird species that rely on these unique wetland habitats.

All of the restored wetlands had increased function compared to farmed and excavated wetlands. However, the average IWC for restored wetlands was 26.5 and ranged from 10.0 to 47.8 which is a similar level of function as highly stressed natural wetlands. The low condition of restored wetlands reflects the lack of a mature vegetative community most notably trees due to the age of the sites (1 to 7 years post construction) or to the maintenance of early successional communities. We would expect the function scores to increase over time if natural successional processes are not inhibited.

Wetland restoration and protection activities need to be integrated into larger landscape level plans to ensure the ability of wetlands to perform functions and provide ecosystem services. To this end, three strategies are recommended in the following priority: protection, enhancement of existing wetlands, and restoration of former wetlands. These strategies are currently being combined into a restoration strategy for the Nanticoke Watershed by a multi-disciplinary team of wetland scientists and managers.

Protecting wetlands through fee simple acquisitions and conservation easements should be the highest priority strategy for maintaining wetland functions and services in the Nanticoke River watershed. Integrating protection of wetlands that are minimally or least stressed and their associated buffers with existing landscape conservation plans will ensure that these systems will remain in tact and be able to provide associated functions.

Enhancement activities should be used to increase the condition of these wetlands by reducing or eliminating the dominant stressors that are impacting different wetland types. These activities will likely produce a greater increase in function in the short term with less effort than attempting to restore former wetlands.

Restoring former wetlands is critical because it increases the acreage of wetlands in the watershed to recover functions from areas that have been effectively drained or changed to non-wetland habitats. Restoration of former wetlands also increases function from pre-restoration levels. More information is needed to understand the functions and services they provide and how these differ from natural wetlands. When restoring former wetlands, data from natural wetlands should be used as guidance during construction to ensure projects will be sustainable in the current landscape.

The full report, "Jacobs, A.D. and D.F. Bleil. 2008. Condition of nontidal wetlands in the Nanticoke River Watershed, Maryland and Delaware. Delaware Department of Natural Resources and Environmental Control, Watershed Assessment Section, Dover, DE 78pp" can be obtained from DNREC/ Division of Water Resources, Watershed Assessment Section, 820 Silver Lake Blvd., Ste 220, Dover, DE 19904 or by calling 302-739-9939.

Appendices

Appendix A

TECHNICAL MONITORING - Brandywine Creek															
Site Locations															
#3 Willow Run Upstream (DuPont Country Club)															
					Dissolved		Nitrate	Alkal-	Conduc-	Phos-	Secchi	Secchi			
		Air	Air	Water	Oxygen	pH	Nitrogen	inity	tivity	phate	Depth	Depth	Rainfall		
Site	Date	Temp oC	Temp oF	Temp oC	mg/l	SU	mg/l	ppm	ug	mg/l	M	FT	Inches	Observer	
8C	4/29/03	16		18	15.9	8	0.25	61	430	0.9	0.195			T. Engle & G. Cooke	
8C	7/23/03	27		23	6.85	7	1	47	430	0.33	0.35			J. Klosiecwicz & T. En	
8C	5/25/05	11.7		13.5	10.2	7	0.5	44	330	0.3	0.2		Showers	John Klosiecwicz	
8C	6/29/05	28.3		23.4	8.7	7.225	1.75	62	310	0.33		8"	Rainy	John Klosiecwicz	
8C	7/19/05	32.2		25.5	17	7	1	44	300	0.48	0.33		Rain	John Klosiecwicz	
8C	9/28/05	32.4		24	8	7.25	2	44	390	0.4	0.23			John Klosiecwicz	
8C	11/2/2005	20		15		6.75	1.25	50	330	0.44	0.2			John Klosiecwicz	
8C	12/12/2005	6.9		6.2	10.6	6.75	1.5	52	1240	0.35	0.17			John Klosiecwicz	
8C															
8C	1/12/2006	18.7		9	9.3	7	0.5	44	280	0.22				John Klosiecwicz	
	2/21/2006	17.5		5.9	9.3	6.75	2	44	510	0.52				John Klosiecwicz	
	3/23/2006	15.4		10.3	8.3	6.75	3	44	340	0.46				John Klosiecwicz	
	6/15/2006	34.5		25.8	5.8	6.75	1.75	44	280	0.3				John Klosiecwicz	
	11/30/2006	20.6		13.5	8.3	6.75	0.25	50	330	0.22				John Klosiecwicz	
	12/27/2006	11.3		8.8	9.8	6.75	0.375	52	320	0.1				John Klosiecwicz	
	1/29/2007	6.4		1.3	10.2	7	0.25	36	1300	0.1				John Klosiecwicz	
	2/23/2007	12.8		2.3	14.1	7	0.25	42	1710	0.1				John Klosiecwicz	
	3/29/2007	12.2		9.1	10.3	7.25	3	44	410	0.1				John Klosiecwicz	
	4/30/2007	27		13.9	8	7.75	0.75	38	280	0.1				John Klosiecwicz	
	6/4/2007	22.6		19.9	8.2	7.75	3	44	330	0.1				John Klosiecwicz	
	7/6/2007	28.7		23.7	6.3	7.25	1.5	44	330	0.17				John Klosiecwicz	
	10/3/2007	26		22.8	7.4	7.5	1	50	400	0.1				John Klosiecwicz	
	11/15/2007	12.6		11.2	9	7	0.25	28	120	0				John Klosiecwicz	
	12/30/2007	6		6.2	14.3	7	1.5	48	380	0.06				John Klosiecwicz	
	MIN	6.0		1.3	5.8	6.75	0.25	28	120	0.00				John Klosiecwicz	
	MAX	34.5		25.8	17	7.75	3.00	62	1710	0.52				John Klosiecwicz	
	AVE	19.2		13.9		7.06	1.30	45	487	0.24					
	STD	9.03		7.91		0.3146	0.9275	6.74	403.79	0.1597					
	Median	18.7		13.5		7.00	1.25	44	330	0.22					
	# of samples	21		21		21	21	21	21	21					
		DO ave June through Sep			9.0										
		DO Median (June-Sept.)			8.1										
		# of samples			6										
		DO Std			4.08										

TECHNICAL MONITORING - Brandywine Creek

Site Locations

#3 Husband's Run (DuPont Country Club) Upstream

Site	Date	Air Temp oC	Air Temp oF	Water Temp oC	Dissolved Oxygen mg/l	pH SU	Nitrate Nitrogen mg/l	Alkal-inity ppm	Conduc-tivity ug	Phos-phate mg/l	Secchi Depth M	Secchi Depth FT	Rainfall Inches	Observer		
8B	4/29/03	21		15	12.1	7.5	0.25	64	330	0.6	0.22			T. Engle & G. Cooke		
	6/16/2003	20		19.5	7.2	7.5	0.25	58	260	0.3	0.57					
8B	7/23/03	27		23	8.8	7.5	2	50	350	0.19	0.43			J. Klosiecwicz & T. Engle		
8B	5/25/05	12.6		11.3	8.7	6.75	0.875	64	310	0.15	0.33		Showers	John Klosiecwicz		
8B	6/29/05	26.9		23.2	5.05	6.9	0.375	68	260	0.39		17"	Rain	John Klosiecwicz		
8B	7/19/05	30.7		24.2	4.25	6.25	0.75	64	220	0.23	0.41		Rain	John Klosiecwicz		
8B	9/28/05	21		18.4	5	6.5	0.5	44	300	0.65	0.37			John Klosiecwicz		
8B	11/1/2005*	19		12		6.75	0.5	58	260	0.44	0.32			John Klosi	*sampling for Oct.	
8B	12/12/2005	4		4.7	9.6	6.75	0.25	42		0.6	0.49			John Klosiecwicz		
8B																
8B	1/12/2006	17		7.9	8.1	7	0.25	44	240	0.11				John Klosiecwicz		
	2/21/2006	9.9		1.6	10.4	6.75	0.5	52	710	0.12				John Klosiecwicz		
	3/23/2006	17.1		5.7	9.7	6.75	1	48	360	0.13				John Klosiecwicz		
	6/15/2006	27.2		23.9	6.7	6.75	1	50	200	0.22				John Klosiecwicz		
	7/15/2006	27.3		23.3	6.8	7	1	52		0.34				John Klosiecwicz		
	11/30/2006	20.8		15.2	8.2	6.75	0.25	66	230	0.17				John Klosiecwicz		
	12/22/2006	15.2		6.3	8.5	7	0.25	52	220	0.09				John Klosiecwicz		
	1/29/2007	10		1.7	10.2	6.75	0.375	36	660	0.1				John Klosiecwicz		
	2/23/2007	16		1.4	14.6	7	0.25	40	1220	0.09				John Klosiecwicz		
	3/29/2007	16.6		8.5	8.1	6.75	1	44	690	0				John Klosiecwicz		
	4/30/2007	26.7		16.7	8.8	7.75	1	48	330	0.1				John Klosiecwicz		
	6/4/2007	24.1		19.5	7.2	7.25	1	50	270	0.2				John Klosiecwicz		
	7/6/2007	31		23.2	5.8	7	0.5	50	200	0.24				John Klosiecwicz		
	10/3/2007	22.5		18.9	3.1	6.75	0.375	74	380	0.1				John Klosiecwicz		
	11/15/2007	12.8		11	8.2	7	0.25	30	130	0.1				John Klosiecwicz		
	12/30/2007	7.7		4	11.4	7	0.25	48	240	0				John Klosiecwicz		
	MIN	4.0		1.4	3.1	6.25	0.25	30	130	0.00						
	MAX	31.0		24.2	14.6	7.75	1.00	74	1220	0.65						
	AVE	18.9		12.8		6.87	0.57	51	372	0.21						
	STD	7.61		8.10		0.2848	0.3151	10.86	259.84	0.1752						
	Median	18.1		11.7		6.75	0.50	50	265	0.14						
	# of sample	22		22		22	22	22	20	22						
		DO ave June through Sep			5.8											
		DO Median (June-Sept.)			5.8											
		# of samples			7											
		DO Std			1.11											

TECHNICAL MONITORING - Brandywine Creek															
Site Locations															
#3 Husband's Run (DuPont Country Club) Downstream of Resevoir															
						Dissolved		Nitrate	Alkal-	Conduc-	Phos-	Secchi	Secchi		
		Air	Air	Water	Water	Oxygen	pH	Nitrogen	inity	tivity	phate	Depth	Depth	Rainfall	
Site	Date	Temp oC	Temp oF	Temp oF	Temp oC	mg/l	SU	mg/l	ppm	ug	mg/l	M	FT	Inches	Observer
8A	6/16/03	20			19.5										
8A	7/25/05						7.5	0.25	58	260	0.3	57			T. Engle & G. Cooke
8A	7/25/05	31			24.9		7	1.75	42	210	0.23	64		Thunder storm	John Klosiecwicz
8A	9/28/05	32.4			20.8	8.1	6.75	1	44	230	0.24	54		Lite Rain	John Klosiecwicz
8A	11/2/2005	15			12		6.75	0.25	50	220	0.29	0.3			John Klosiecwicz
8A	12/12/2005	13.6			3	8.7	6.75	0.5	42	730	0.53	0.25			John Klosiecwicz
8A															John Klosiecwicz
8A	1/12/2006	17			9.2		7	1	34	260	0.44				
8A	2/21/2006	19.2			9.2	7.9	6.75	1.5	40	860	0.3				John Klosiecwicz
	3/23/2006	23.3			10.9	7.7	7.25	1	42	650	0.08				John Klosiecwicz
	6/15/2006	24.4			21.1	6.7	7	3	30	200	0.24				John Klosiecwicz
	11/30/2006	20.6			14.2	8.4	6.75	0.25	44	220	0.24				John Klosiecwicz
	12/22/2006	13.3			6.3	8.5	6.75	0.5	50	230	0.06				John Klosiecwicz
	1/29/2007	10.4			2.9	9.4	7	0.5	36	440	0.11				John Klosiecwicz
	2/23/2007	15.1			2	9.4	7	0.37	32	1170	0.54				John Klosiecwicz
	3/29/2007	22.5			14.6	7.9	7.25	1.5	44	600	0.1				John Klosiecwicz
	5/1/2007	22.8			17.4	7.6	7.25	1	44	280	0.1				John Klosiecwicz
	10/4/2007	30.3			19	13.5	6.75	0.75	28	210	0.1				John Klosiecwicz
	11/15/2007	13.9			9.5	8.8	7.5	0.25	32	180	0.1				John Klosiecwicz
	12/30/2007	6.6			5.3	11.2	7	0.75	24	220	0.14				John Klosiecwicz
	MIN	6.6			2.0	6.7	6.75	0.25	24	180	0.06				
	MAX	32.4			24.9	13.5	7.50	3.00	58	1170	0.54				
	AVE	19.5			12.3		7.00	0.90	40	398	0.23				
	STD	7.17			7.01		0.2572	0.7024	8.67	285.60	0.1506				
	Median	19.6			11.5		7.00	0.75	42	245	0.24				
	# of samples	18			18	0	18	18	18	18	18				
			DO ave June through Sep			7.47									
			DO Median (June-Sept.)			7.60									
			# of samples			3									
			DO Std			0.71									

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
BC1	9/15/2002 0:00	24	22.3	5.5	7.5	0.25	100	378	0.16	0.872	Ralph and Cynthia Stahl
BC1	10/13/2002 0:00	21	17.4	9.5	7.5	2	64	246	0.28	0.54	Ralph Cynthia and Geoffrey Stahl
BC1	11/10/2002 0:00	21	11.5	12.6	7.5	2	81	311	0.26	0.623	Ralph and Cynthia Stahl
BC1	12/22/2002 0:00	10	6.4	12.5	7.5	0.25	72	251	0.38	1	Ralph Cynthia and Geoffrey Stahl
BC1	3/10/2003 0:00	26.7	25.3	8.9	7.5	4	60	235	0.34	1	R.Stahl,C.Stahl,G.Stahl
BC1	3/16/2003 0:00	13.3	10.4	12.4	7.5	2	42	246	0.26	0.79	R.Stahl,C.Stahl,G.Stahl
BC1	4/20/2003 0:00	16.6	18	11.75	7.5	2	64	232	0.04	1.25	R.Stahl,C.Stahl,G.Stahl
BC1	5/25/2003 0:00	15.4	15.4	9.9	7.5	4	60	257	0.24	1.15	R.Stahl,C.Stahl,G.Stahl
BC1	8/17/2003 0:00	29.4	23.3	8.3	8	2	52	249	0.1	1.04	R.Stahl,C.Stahl,G.Stahl
BC1	9/27/2003 0:00	25.6	19.9	9.1	7.5	2	64	223	0	0.75	R.Stahl,C.Stahl,G.Stahl
BC1	10/19/2003 0:00	15.6	15.6	10	7.5	2	68	221	0.2	0.83	R.Stahl,C.Stahl,G.Stahl
BC1	11/23/2003 0:00	13.3	9.8	11.3	7.5	2	58	225	0.36	0.83	R.Stahl,C.Stahl,G.Stahl
BC1	12/20/2003 0:00	0	3.8	12.95	7.5	2	59.5	223	0.1	0.75	R.Stahl,C.Stahl,G.Stahl
BC1	2/14/2004 0:00	10	5	12.5	7.5	2	61	248	0.28	0.96	R.Stahl,C.Stahl,G.Stahl
BC1	3/14/2004 0:00	10	6.2	12.4	7.5	2	52	247	0.18	1.08	R.Stahl,C.Stahl,G.Stahl
BC1	4/18/2004 0:00	25.6	25.8	11	7.5	2	46	187	0.1	0.42	R.Stahl,C.Stahl,G.Stahl
BC1	6/13/2004 0:00	25.6	19.4	9.4	7.5	2	60	228	0.3	0.96	R.Stahl,C.Stahl,G.Stahl
BC1	8/21/2004 0:00	26.7	24.6	8.7	8	2	66	251	0.24	1.04	R.Stahl,C.Stahl,G.Stahl
BC1	9/25/2004 0:00	25.6	21	9.5	7.5	2	74	280	0.22	0.83	R.Stahl,C.Stahl,G.Stahl
BC1	10/3/2004 0:00	24.4	17.2	10.4	7.5	2	60	254	0.18	0.88	R.Stahl,C.Stahl,G.Stahl
BC1	2/12/2005 0:00	7.8	8.5	10.4	7.5	1	58	258	0.2	0.46	R.Stahl,C.Stahl,G.Stahl
BC1	3/19/2005 0:00	15.6	7.5	9.8	7.5	2	46	291	0.2	1.5	R.Stahl,C.Stahl,G.Stahl
BC1	4/16/2005 0:00	12.8	12.2	8.55	7.5	2	46	247	0.22	0.75	R.Stahl,C.Stahl
BC1	5/8/2005 0:00	20	14.7	6.6	0	0.5	52	262	0.12	1.17	R.Stahl,C.Stahl,G.Stahl
BC1	6/26/2005 0:00	30	26.3	4.5	7.5	2	58	294	0.26	0.75	Ralph,Cynthia, and Geoggrey Stahl
BC1	7/31/2005 0:00	29.4	23	3.8	7.5	1	60	308	0.12	0.46	Ralph, Cynthia, and Geoffrey Stahl
BC1	8/27/2005 0:00	26.6	27.7	5.3	7.5	0.5	82	326	0.3	0.67	Ralph Stahl
BC1	9/24/2005 0:00	23.8	24.7	6.9	8	1	79	324	0.3	0.42	Ralph Stahl
BC1	10/16/2005 0:00	64	16	7.9	7.5	0.5	66	152	0.42	1	Ralph Stahl
BC1	11/26/2005 0:00	10	3.8	9	7.5	0.5	58	63	0.2	0.789	Ralph and Cynthia Stahl
BC1	12/23/2005 0:00	10	4.1	6.7	7.5	0.75	60	294	0.1	1.12	Ralph and Cynthia Stahl
BC1	1/22/2006 0:00	6	6.8	8.1	7	0.5	59	173	0.16	0.833	Ralph and Cynthia Stahl
BC1	2/25/2006 0:00	12	7.1	8.4	7.5	4	56	242	0.14	1.3	Ralph and Cynthia Stahl
BC1	3/30/2006 0:00	21	13	9	9	4	52	251	0	1	Ralph, Cynthia and Geoffrey Staph
BC1	4/14/2006 0:00	21	17	8	7.5	2	64	258	0	0	Ralph, Cynthia and Geoffrey Staph
BC1	5/28/2006 0:00	25	22	6	7.5	4	64	397	0	1	Ralph, Cynthia and Geoffrey Staph
BC1	6/24/2006 0:00	29	27	5	7.5	4	64	385	0	0.5	Ralph, Cynthia and Geoffrey Staph
BC1	7/28/2006 0:00	34.4	25.9	4.2	7.5	2	48	263	0.36	0.66	Ralph, Cynthia, and Geoffrey Stahl
BC1	8/27/2006 0:00	24.7	26.1	4.1	7.5	2	66	435	0.28	6.25	Raloh, Cynthia, and Geoffrey Stahl
BC1	9/23/2006 0:00	26.7	18.8	5.2	7.5	2	62	419	0.32	0.67	Ralph and Cynthia Stahl
BC1	11/19/2006 0:00	12.2	10.4	6.7	7.5	0.5	60	281	0.27	0.75	Ralph, Cynthia, and Geoffrey Stahl
BC1	12/16/2006 0:00	11	9.4	0	7.5	0.5	52	383	0.19	0.75	Ralph and Cynthia Stahl
	Min	0	3.8	3.8	0	0.25	42	63	0		
	Max	64	27.7	9.5	9	4	114	435	0.6		
	Ave	19.876	15.762		7.45	1.89	64.8	273.14	0.2024		
	Std	10.5381825	7.602681858		1.126	1.135197546	13.84793509	69.478527	0.130955048		
	Median	21	15.8		7.5	2	61.5	257.5	0.2		
	Count	50	50		50	50	50	50	50		
	DO ave June through Sept.			6.68							
	DO Median (June-Sept.)			5.7							
	# of samples			17							
	DO Std			2.18							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
BC2	9/15/2002 0:00	24	21.6	7.6	7.5	2	100	395	0.3	1.291	Ralph and Cynthia Stahl
BC2	10/13/2002 0:00	21	18.2	9.6	7.5	2	64	246	0.34	0.416	Ralph Geoffrey and Cynthia Stahl
BC2	11/10/2002 0:00	21	12.2	11.3	7.5	2	84	306	0.3	0.5	Ralph and Cynthia Stahl
BC2	12/22/2002 0:00	12	5.2	11.4	7.5	0.25	64	262	0.28	1	Ralph Cynthia and Geoffrey Stahl
BC2	3/16/2003 0:00	14.4	10.3	11.9	7.5	2	48	246	0.14	1.08	R.Stahl,C.Stahl,G.Stahl
BC2	4/20/2003 0:00	16.7	11.3	11.5	7.5	2	56	273	0.06	0.5	Rstahl,C.Stahl,G.Stahl
BC2	5/25/2003 0:00	16.7	14.1	10	7.5	4	46	262	0.26	0.67	R.Stahl,C.Stahl,G.Stahl
BC2	7/20/2003 0:00	27.8	23.2	9.5	7.5	4	64	243	0.3	0.79	R.Stahl,C.Stahl,G.Stahl
BC2	8/17/2003 0:00	29.4	23.2	8.3	8	2	64	250	0.16	0	R.Stahl,C.Stahl,G.Stahl
BC2	9/27/2003 0:00	25.6	20	8.9	7.5	2	56	219	0	1.04	R.Stahl,C.Stahl,G.Stahl
BC2	10/19/2003 0:00	18.3	13.1	10.3	7.5	2	56	232	0.14	0.83	R.Stahl,C.Stahl,G.Stahl
BC2	11/23/2003 0:00	13.3	11.9	11	7.5	2	48	211	0.2	0.92	R.Stahl,C.Stahl,G.Stahl
BC2	12/20/2003 0:00	3.3	4.2	12.3	7.5	2	48	220	0.06	0.79	R.Stahl,C.Stahl,G.Stahl
BC2	2/14/2004 0:00	8.9	4.4	12.1	7.5	2	44	238	0.2	0.96	R.Stahl,C.Stahl,G.Stahl
BC2	3/14/2004 0:00	7.2	5.2	11.7	7.5	2	48	237	0.2	0.63	R.Stahl,C.Stahl,G.Stahl
BC2	4/18/2004 0:00	25	15.7	10.6	7.5	2	54	230	0.18	1.16	R.Stahl,C.Stahl,G.Stahl
BC2	6/13/2004 0:00	24.4	18.7	9	7.5	2	62	230	0.22	0.42	R.Stahl,C.Stahl
BC2	8/21/2004 0:00	28.3	24.4	8.7	8	2	64	246	0.22	0.54	R.Stahl,C.Stahl,G.Stahl
BC2	9/25/2004 0:00	26.7	20.3	9.3	8	2	62	281	0.3	0.5	R.Stahl,C.Stahl,G.Stahl
BC2	10/3/2004 0:00	26.7	17.6	9.4	7.5	1	60	253	0.16	0.54	R.Stahl,C.Stahl,G.Stahl
BC2	2/12/2005 0:00	0	5.4	10.6	7.5	1	48	273	0.08	0.75	R.Stahl,C.Stahl,G.Stahl
BC2	3/19/2005 0:00	15.6	7.4	10.8	7.5	2	50	286	0.22	0.92	R.Stahl,C.Stahl,G.Stahl
BC2	4/16/2005 0:00	0	11.2	6.6	7.5	2	42	245	0.14	0.92	R.Stahl,C.Stahl,G.Stahl
BC2	5/8/2005 0:00	18.3	16.8	8.35	7.5	0.5	48	249	0.14	0.83	R.Stahl,C.Stahl,G.Stahl
BC2	6/26/2005 0:00	30.5	31	3.4	7.7	2	60	263	0.2	0.73	Ralph, Cynthia, and Geoffrey Stahl
BC2	7/31/2005 0:00	29.4	25.4	6.6	8	2	64	307	0.18	0	Ralph, Geoffrey, and Cynthia Stahl
BC2	8/27/2005 0:00	26.6	28.8	4.6	7.5	1	79	304	0.34	1	Ralph Stahl
BC2	9/24/2005 0:00	23.8	23.5	6.6	8	1	73	337	0.24	0.71	Ralph Stahl
BC2	10/16/2005 0:00	64	15.7	6.6	7.5	0.5	70	151	0.28	0.75	Ralph Stahl
BC2	11/26/2005 0:00	10	4.5	6.7	7.5	0.5	60	61	0.08	0.5	Ralph and Cynthia Stahl
BC2	12/23/2005 0:00	10	3.1	7.2	7	0.75	60	277	0.12	0.36	Ralph and Cynthia Stahl
BC2	1/22/2006 0:00	6	6.1	8.3	7.5	0.5	58	211	0.22	0.75	Ralph and Cynthia Stahl
BC2	2/25/2006 0:00	12	7.3	10.1	7.5	4	54	206	0.18	0.833	Ralph and Cynthia Stahl
BC2	3/30/2006 0:00	21.5	13.4	8.3	9	4	48	247	0.19	7.5	Ralph, Cynthia and Geoffrey Staph
BC2	4/14/2006 0:00	22	16.4	7	7.5	4	62	254	0.23	8	Ralph, Cynthia and Geoffrey Staph
BC2	5/28/2006 0:00	26	20.2	5.2	7.5	3	64	403	0.31	0	Ralph, Cynthia and Geoffrey Staph
BC2	6/24/2006 0:00	29	27.2	4.6	7.5	4	62	426	0.35	0	Ralph, Cynthia and Geoffrey Staph
BC2	7/28/2006 0:00	32.2	26.2	4.8	7.5	2	46	284	0.37	0.66	Ralph, Cynthia and Geoffrey Staph
BC2	8/27/2006 0:00	28.2	27.5	4.8	7.5	4	62	428	0.3	0.83	Ralph, cynthia, and Geoffery Stahl
BC2	9/23/2006 0:00	26.7	18.7	6.7	7.5	2	60	419	0.18	0.5	Ralph and Cynthia Stahl
BC2	11/19/2006 0:00	15.6	10.2	6.5	7.5	0.5	56	334	0.35	0.75	Ralph, Cynthia, and Geoffrey Stahl
BC2	12/16/2006 0:00	10	9.3	0	7.5	1	50	398	0.18	0.83	Ralph and Cynthia Stahl
BC2	6/23/2007 0:00	23.6	20.6	5.2	8	2	60	244	0.33	0	Ralph, Cynthis & Geoffrey Stahl
	Min	0	3.1	4.8	7	0.25	42	61	0		
	Max	64	31	12.3	9	4	100	428	0.37		
	Ave	20.27	15.60		7.60	1.99	58.79	271.79	0.21		
	Std	11.04	7.81		0.29	1.09	11.12	72.49	0.09		
	Median	21.50	15.70		7.50	2.00	60.00	253.00	0.20		
	#of Samples	43	43		43	43	43	43	43		
		DO ave June through Sept.		6.71							
		DO Median (June-Sept.)		6.65							
		# of samples		14							
		DO Std		1.98							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
BC3	4/19/2000 0:00	8	8.5	11.2	7	2	58	200	0	0	Bob Breazeale & Dick Reeves
BC3	5/24/2000 0:00	18.5	15	7.7	7	1	60	180	0	0	Bob Breazeale & Dick Reeves
BC3	6/16/2000 0:00	24.5	20	6.5	7	2	60	180	0	0	Bob Breazeale & Dick Reeves
BC3	8/23/2000 0:00	20	18	8.3	7	2	68	0	0	0	Bob Breazeale & Dick Reeves
BC3	9/29/2000 0:00	11	11	9.9	7	2	66	220	0	0	Bob Breazeale & Dick Reeves
BC3	11/7/2000 0:00	7	7	10.4	7	1	70	250	0	0	Bob Breazeale & Dick Reeves
BC3	1/17/2001 0:00	5	0	13.7	7	1	49	7	0	0	Bob Breazeale & Dick Reeves
BC3	4/9/2001 0:00	25	15.5	15.3	8	3	48	290	0	0	Bob Breazeale & Dick Reeves
BC3	5/11/2001 0:00	20	16	7.3	7	4	61	270	0	0	Bob Breazeale & Dick Reeves
BC3	6/13/2001 0:00	24.5	20	7.1	7	3	61	370	0	0	Bob Breazeale & Dick Reeves
BC3	7/13/2001 0:00	21	18	7.5	7	2	64	290	0	0	Bob Breazeale & Dick Reeves
BC3	8/7/2001 0:00	25	23	6.1	7	2	68	350	0	0	Bob Breazeale & Dick Reeves
BC3	9/6/2001 0:00	19	17.5	7.1	7	2	70	370	0	0	Bob Breazeale & Dick Reeves
BC3	11/14/2001 0:00	13	8	10.1	7	2	70	290	0	0	Bob Breazeale & Dick Reeves
BC3	2/26/2002 0:00	9	6	0	7	3	64	340	0	0	Bob Breazeale & Dick Reeves
BC3	4/15/2002 0:00	27	23	13.7	9	1	82	150	0	0	Bob Breazeale & Dick Reeves
BC3	5/16/2002 0:00	23	19	10.1	7	2	61	260	0	0	Bob Breazeale & Dick Reeves
BC3	7/17/2002 0:00	24	20	3.8	7	0.25	68	240	0	0	Bob Breazeale & Dick Reeves
BC3	9/6/2002 0:00	18	17.5	6	7	0.5	74	250	0	0	Bob Breazeale & Dick Reeves
BC3	3/26/2003 0:00	24	17	14.65	8	2	39	460	0	0	B.Breazeale and D.Reeves
BC3	5/30/2003 0:00	18	15	8.95	7	2	54	290	0	0	B.Breazeale and D.Reeves
BC3	7/24/2003 0:00	24	21.5	6.75	7	2	43	240	0.8	0	B.Breazeale and D.Reeves
BC3	8/24/2003 0:00	23.6	20.5	8.4	7	1	62	390	0.45	0.88	A.Quisel, K.Tullis
BC3	10/16/2003 0:00	21	15	10	7	2	50	210	0	0	B.Breazeale and Dick Reeves
BC3	5/14/2004 0:00	25.5	23.5	9.3	7	2	49	260	0.2	0	B.Breazeale and D.Reeves
BC3	8/2/2004 0:00	25	22	7.1	7	1	50	210	0.2	0	B.Breazeale and D.Reeves
BC3	9/29/2004 0:00	20	19	8.1	7	1	40	200	0.3	0	B.Breazeale and D.Reeves
BC3	5/25/2005 0:00	11.3	11.4	11	7	1	60	300	0.53	0	Anna Quisel
BC3	10/20/2005 0:00	10	13	12.5	7	0.5	48	300	0.3	0	Anna Quisel, MD
BC3	1/29/2006 0:00	7.5	6	11	7	0.5	50	520	0.15	0	Anna Quisel, Kate Tullis
BC3	2/28/2006 0:00	9.5	3	9.7	7	3	43	380	0.31	0	Anna Quisel
BC3	4/26/2006 0:00	10	11	7	7	0.25	34	240	0.24	0	Kate Tullis
BC3	7/28/2006 0:00	27.5	25.5	7	7	0.25	48	210	0.24	0	ANNA QUISEL
BC3	8/25/2006 0:00	25.5	22.5	8.5	7.5	0.25	50	340	0.1	0	KATE TULLIS AND ANNA QUISEL
BC3	9/25/2006 0:00	0	21	7.2	7	0.25	44	230	0.18	0	KATE TULLIS
BC3	10/3/2006 0:00	17	16	7.2	7.5	0.25	36	230	0.24	0	KATE TULLIS
BC3	11/21/2006 0:00	8.5	10	12	7	0.25	56	260	0.22	0	Anna Quisel
BC3	12/28/2006 0:00	0.5	4.5	13.5	7	0.25	52	230	0.04	0	ANNA QUISEL
	Min	0	3		7	0.25	34	200	0	0	
	Max	27.5	25.5		8	3	74	520	0.8	0.88	
	Ave	16.32	15.75		7.10	1.01	49.10	287.50	0.23	0.04	
	Std	8.55	6.51		0.26	0.85	9.39	88.55	0.20	0.20	
	Median	18.00	16.50		7.00	0.75	49.50	255.00	0.21	0.00	
	#of Samples	20	20		20	20	20	20	20	20	
		DO ave June through Sept.		7.38125							
		DO Median (June-Sept.)		7.15							
		# of samples		8							
		DO Std		0.88							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
BC4	9/6/2002 0:00	20	18	0	7.4	1	56	220	0	0	Bob Breazeale & Dick Reeves
BC4	3/26/2003 0:00	22	15	11.45	7	2	23	200	0.4	0	B.Breazeale and D.Reeves
BC4	5/30/2003 0:00	22	18	8.85	7	1	29	190	0.1	0	B.Breazeale and D.Reeves
BC4	7/24/2003 0:00	0	0	0	7	1	28	190	0	0	B.Breazeale and D.Reeves
BC4	8/24/2003 0:00	25	19.5	8.7	7	0.25	42.5	250	0.15	0.5	A.Quisel, K.Tullis
BC4	10/16/2003 0:00	18	14.5	9.9	7	1	34	170	0	0	B.Breazeale and D.Reeves
BC4	5/14/2004 0:00	26	25	7.8	7.5	1	32	200	0.2	0	B.Breazeale and D.Reeves
BC4	8/2/2004 0:00	30	23.5	7.4	7	1	30	160	0.2	0	B.Breazeale and D.Reeves
BC4	9/29/2004 0:00	21	19.5	7.9	7	1	26	120	0.2	0	B.Breazeale and Dick Reeves
BC4	5/25/2005 0:00	10.9	12.3	10.8	7	0.75	36.5	220	0.11	0	Anna Quisel
BC4	10/20/2005 0:00	14	12.5	9.6	7	0.25	41	260	0.58	0	Anna Quisel, MD
BC4	1/29/2006 0:00	9.5	6	12.4	6.5	0.5	28	220	0.15	0	Anne Quisel, Kate Tullis
BC4	2/28/2006 0:00	9	4.5	8.1	7	3	26	210	0.02	0	Anna Quisel
BC4	4/26/2006 0:00	9	10	7	7.5	0.5	40	230	0.2	0	KATE TULLIS
BC4	7/28/2006 0:00	30.5	26	7	7	0.25	38	200	0.2	0	ANNA QUISEL
BC4	8/25/2006 0:00	26	20.5	7.2	7	0.25	38	230	0.2	0	KATE TULLIS AND ANNA QUISEL
BC4	9/25/2006 0:00	0	19	7	7	0.25	38	240	0.18	0	KATE TULLIS
BC4	10/31/2006 0:00	17	18	7	7.5	0.25	39	210	0.2	0	KATE TULLIS
BC4	11/21/2006 0:00	9	10	12.2	7	0.25	29	190	0.1	0	ANNA QUISEL
BC4	12/28/2006 0:00	0.5	4.5	14	7	0.25	33	190	0.06	0	ANNA QUISEL
	Min	0	0	0	6.5	0.25	23	120	0		
	Max	30.5	26	8.7	7.5	3	56	260	0.58		
	Ave	15.97	14.82		7.07	0.79	34.35	205.00	0.16		
	Std	9.67	7.24		0.24	0.69	7.64	32.20	0.14		
	Median	17.50	16.50		7.00	0.63	33.50	205.00	0.17		
	# of samples	20	20		20	20	20	20	20		
		DO ave June through Sept.		5.65							
		DO Median (June-Sept.)		7.1							
		# of samples		8							
		DO Std		3.53							

AR0011927

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
BC5	9/29/2002 0:00	24.5	17.3	9.2	7.25	0	46	169.9	0.1	0	Carol and George Fox
BC5	11/1/2002 0:00	11	5.3	12.5	7	0.5	59	256	0	0	Carol and George Fox
BC5	12/8/2002 0:00	9	2	14.8	7	1	50	2940	0	0	Carol and George Fox
BC5	12/31/2002 0:00	10	6.2	12.75	7.25	1	42	486	0	0	Carol and George Fox
BC5	2/2/2003 0:00	6	0.5	14.4	7.25	1	54	1736	0	0	George and Carol Fox
BC5	3/1/2003 0:00	3.5	3.4	13.9	7.25	1	38	2760	0	0	George and Carol Fox
BC5	3/29/2003 0:00	21	12.3	11.7	7.5	0.75	36	373	0	0	George and Carol Fox
BC5	4/27/2003 0:00	18	13.1	11.4	7.5	0.5	45	265	0	0	George Fox
BC5	6/1/2003 0:00	13	13.7	9.8	7.5	0.5	48	233	0	0	George and CarolFox
BC5	7/4/2003 0:00	25	19.6	9.6	7.25	0.25	47	228	0	0	George Fox
BC5	8/3/2003 0:00	27.5	21.7	8.45	7.5	0.75	48	231	0	0	George and Carol Fox
BC5	9/7/2003 0:00	20.5	16.6	9.35	7.5	0.5	49	218	0.1	0	George and Carol Fox
BC5	10/5/2003 0:00	12.5	11.8	11.2	7.5	0.5	47	251	0	0	George and Carol Fox
BC5	11/2/2003 0:00	24.5	15.3	0.99	7	0.25	44	193.9	0	0	George and Carol Fox
BC5	11/30/2003 0:00	10	7.2	12.05	7	0.5	44	187.2	0	0	George and Carol Fox
BC5	1/1/2004 0:00	8.5	4.9	13.75	7.5	0.5	38	274	0	0	George and Carol Fox
BC5	2/8/2004 0:00	2	1.5	14.4	7	0.5	34	677	0	0	George and Carol Fox
BC5	2/29/2004 0:00	16	4.7	14.5	7.5	0.74	34	451	0	0	George and Carol Fox
BC5	4/3/2004 0:00	11	8.7	11.15	7.5	0.5	50	314	0	0	George and Carol Fox
BC5	4/25/2004 0:00	11	11.8	10.45	7.5	0.5	50	272	0	0	George and Carol Fox
BC5	6/6/2004 0:00	17	15.7	9.25	7.5	0.5	46	307	0	0	George and Carol Fox
BC5	7/11/2004 0:00	24.5	19.2	8.7	7.25	0.25	56	269	0	0	George and Carol Fox
BC5	8/3/2004 0:00	27.5	23.4	7.9	7.25	0.25	52	230	0	0	George Fox
BC5	8/29/2004 0:00	26.5	21.1	8.7	7.25	0.25	44	258	0	0	George Fox
BC5	10/3/2004 0:00	16	14.3	9.45	7.5	0.5	48	213	0	0	George and Carol Fox
BC5	10/31/2004 0:00	20.5	15.1	8.8	7.5	0.25	47	217	0	0	George and Carol Fox
BC5	12/5/2004 0:00	12	6.7	12.4	7.5	0.5	39	208	0	0	George Fox
BC5	1/1/2005 0:00	16.5	6.5	13.05	7.5	0.5	50	320	0.5	0	George and Carol Fox
BC5	2/6/2005 0:00	9.5	3.4	14.5	7.5	0.25	40	1373	0.25	0	George Fox
BC5	3/6/2005 0:00	9	3.7	13.4	7.5	0.5	43	958	0	0	George and Carol Fox
BC5	4/10/2005 0:00	20	13.6	10.8	7	0.5	36	235	0	0	George and Carol Fox
BC5	5/8/2005 0:00	18	11.5	10.9	7.25	0.75	4	253	0.75	0	George and Carol Fox0
BC5	6/5/2005 0:00	21	15.5	9.2	6.75	0.375	47	283	0	0	George and Carol Fox
BC5	7/10/2005 0:00	24	19.1	8.95	7	0.5	54	221	0.5	0	George Fox
BC5	8/6/2005 0:00	24	22.2	7.7	7.25	0.5	56	252	0.5	0	George Fox
BC5	9/10/2005 0:00	25	18.4	9.3	7	0.25	58	267	0	0	George and Carol Fox
BC5	10/2/2005 0:00	18	14.7	10.2	7	0.25	56	234	0	0	George & Carol Fox
BC5	10/30/2005 0:00	18.5	10.2	11.9	7	0.5	54	269	0.05	0	George and Carol Fox
BC5	12/3/2005 0:00	0	2.2	13.15	7.25	0.25	51	248	0	0	George and Carol Fox
BC5	12/30/2005 0:00	17.5	8.7	11.6	7.5	0.75	72	360	0	0	George and Carol Fox
BC5	1/1/2006 0:00	4	4.8	13.25	7.25	0.5	48	488	0	0	George Fox
BC5	1/29/2006 0:00	8	4.4	13.5	7.25	1	50	286	0	0	George and Carol Fox
BC5	2/25/2006 0:00	11	5	12	8	1	40	470	0	2	Carol and George Fox
BC5	4/7/2006 0:00	12	11	11	7.5	0.75	47	320	0	2	Carol and George Fox
BC5	4/29/2006 0:00	16	12	11	7	0.75	47	300	0.06	2	Carol and George Fox
BC5	6/4/2006 0:00	20	16	10	7	0.75	46	210	0.15	2	Carol and George Fox
BC5	7/9/2006 0:00	25.5	18.7	10.2	7.5	1	50	230	0.1	0	George and Carol Fox
BC5	8/5/2006 0:00	27	24.1	7.2	7.25	0.75	51	270	0.1	0	George Fox
BC5	9/4/2006 0:00	21	18	10.4	7.25	0.5	46	220	0	0	George Fox
BC5	10/8/2006 0:00	15	12.7	10.2	7.25	0.75	48	230	0	0	George Fox
BC5	11/5/2006 0:00	13.5	7.2	11.2	7.25	1	46	210	0	0	Carol and George Fox
BC5	12/3/2006 0:00	7	5.9	12.7	7.25	0.75	44	250	0	0	george fox
BC5	1/7/2007 0:00	10	7.9	12.1	7.25	0.75	43	230	0	0	George Fox
BC5	6/10/2007 0:00	23	19.4	8.5	7.5	0.75	45	270	0	0	George Fox
	Min	0.00	0.50		6.75	0.00	4.00	169.90	0.00		
	Max	27.50	24.10		8.00	1.00	72.00	2940.00	0.75		
	Ave	15.97	11.66		7.30	0.58	46.43	434.72	0.06		
	Std	7.2336	6.4433		0.2282	0.2527	8.9455	551.6192	0.1541		
	Median	16	12		7	1	47	262	0		
	#of samples	54	54		54	54	54	54	54		
	DO ave June through Sept.			9.02							
	DO Median (June-Sept.)			9.20							
	# of samples			18							
	DO Std			0.8616							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
BC6	9/29/2002 0:00	21	16.9	9.5	7.5	0.75	80	503	0.1	0	Carol and George Fox
BC6	11/3/2002 0:00	8.5	5.5	12.95	7.5	1	80	477	0.08	0	Carol and George Fox
BC6	12/8/2002 0:00	8	3	14.5	7.5	3	67	0	0	0	Carol and George Fox
BC6	12/31/2002 0:00	11	7.2	12.7	7.5	3	56	398	0.1	0	Carol and George Fox
BC6	2/2/2003 0:00	5.5	4	13.8	7.5	3	60	1185	0	0	George and Carol Fox
BC6	3/1/2003 0:00	3.5	3.9	13.7	7.25	3	43	910	0	0	George and Carol Fox
BC6	3/29/2003 0:00	12.7	12.7	11.65	7.5	2	44	325	0.1	0	George and Carol Fox
BC6	4/27/2003 0:00	18	17.1	11.7	7.5	2	52	335	0	0	George and Carol Fox
BC6	6/1/2003 0:00	13	15.1	9.75	7.5	1	62	312	0	0	George and Carol Fox
BC6	7/4/2003 0:00	25	18	9.5	7	0.5	46	272	0.1	0	George and Carol Fox
BC6	8/3/2003 0:00	26	20.8	8.45	7.5	0.25	58	299	0	0	George and Carol Fox
BC6	9/7/2003 0:00	19.5	17.4	9.7	7.5	1	67	297	0	0	George and Carol Fox
BC6	10/5/2003 0:00	13	13.5	11.1	7.5	0.75	64	268	0	0	George and Carol Fox
BC6	11/2/2003 0:00	24	14.2	10.5	7.5	1.5	58	254	0	0	George and Carol Fox
BC6	11/30/2003 0:00	9.5	7.1	12.7	7.5	1	56	246	0	0	George and Carol Fox
BC6	1/1/2004 0:00	10	5.5	13.25	7.5	2	50	288	0	0	George and Carol Fox
BC6	2/8/2004 0:00	-1	1.8	14.2	7	1	43	459	0	0	George and Carol Fox
BC6	2/29/2004 0:00	0	0	13.85	7.5	1.5	53	402	0	0	George Fox and Carol Fox
BC6	4/3/2004 0:00	11	9.3	11.15	8	1	62	475	0	0	George and Carol Fox
BC6	4/25/2004 0:00	14	12.1	10.8	7.5	1	60	291	0	0	George and Carol Fox
BC6	6/6/2004 0:00	17	16.1	9.45	7.5	0.75	65	323	0	0	George and Carol Fox
BC6	7/11/2004 0:00	23	19.3	9.1	7.5	0.75	74	324	0	0	George and Carol Fox
BC6	8/3/2004 0:00	29	23.2	8.5	7.5	0.75	68	289	0	0	George and Carol Fox
BC6	8/29/2004 0:00	25.5	20.9	9.1	7.25	0.5	72	313	0	0	George and Carol Fox
BC6	10/3/2004 0:00	15	14.2	9.65	7.5	0.75	56	251	0	0	George and Carol Fox
BC6	10/31/2004 0:00	24	65	9	7.5	0.75	65	278	0	0	George and Carol Fox
BC6	12/5/2004 0:00	12.5	5.9	12.1	7.5	0.75	56	251	0	0	George Fox
BC6	1/1/2005 0:00	17	7	13.45	7.5	0.75	56	287	0	0	George and Carol Fox
BC6	2/6/2005 0:00	9	4.2	14.1	7.5	0.75	60	677	0	0	George Fox
BC6	3/6/2005 0:00	8	3.2	12.2	7	0.75	55	739	0	0	George and Carol Fox
BC6	4/10/2005 0:00	19	13.4	10.55	7.25	1	47	231	0	0	George and Carol Fox
BC6	5/8/2005 0:00	17.5	11.7	11	7.5	0	55	267	0	0	George and Carol Fox
BC6	6/5/2005 0:00	19	15.3	9.3	7.5	0.75	66	305	0	0	George and Carol Fox
BC6	7/10/2005 0:00	21.5	18.2	8.5	7.25	1	76	296	0	0	George Fox
BC6	8/6/2005 0:00	23.5	22.3	8.1	7.5	1	85	333	1	0	George Fox
BC6	9/10/2005 0:00	21.5	17.1	9.35	7.5	1	86	354	0	0	George and Carol Fox
BC6	10/2/2005 0:00	16.5	13.1	10.1	7.5	0.75	83	359	0	0	George & Carol Fox
BC6	12/3/2005 0:00	1	3.3	13.75	7.25	0.5	66	317	0	0	Goerge Fox
BC6	1/1/2006 0:00	7	5.5	13.1	7.25	0.75	69	469	0	0	George Fox
BC6	1/29/2006 0:00	6	5.2	13.1	7	1	57	302	0	0	George and Carol Fox
BC6	2/25/2006 0:00	11	6	12	7.5	2	56	410	0	1	Carol and George Fox
BC6	4/9/2006 0:00	12	10	11	7.5	1.5	67	450	0	1	Carol and George Fox
BC6	4/29/2006 0:00	16	11	11	7.5	0.25	58	320	0	1	Carol and George Fox
BC6	6/4/2006 0:00	19	16	9	7.5	0.75	60	270	0.1	3	Carol and George Fox
BC6	7/9/2006 0:00	25	18.9	8.8	7.5	2	64	290	0	0	George and Carol Fox
BC6	8/5/2006 0:00	29.5	24.9	7.8	7.5	3	66	300	0	0	George fox
BC6	9/4/2006 0:00	21	17.5	9.2	7.25	1	72	330	0	0	George Fox
BC6	10/8/2006 0:00	14	12.4	10.2	7.5	1.5	80	340	0	0	George fox
BC6	11/5/2006 0:00	9	6.1	11.2	7.5	2	6.1	360	0.04	0	George and Carol Fox
BC6	12/3/2006 0:00	6.5	5.8	12.5	7.5	2	62	310	0	0	George Fox
BC6	1/7/2007 0:00	9	7.8	12.2	7.25	1	61	280	0	0	George Fox
BC6	6/10/2007 0:00	21.5	19	8.9	7.25	3	65	320	0.3	0	George Fox
	MIN	-1	0	7.8	7	0	6.1	0	0		
	MAX	29.5	65	15.3	8	3	86	1185	1		
	AVE	14.85	12.70		7.43	1.26	61.08	361.53	0.04		
	STD	7.6037	9.8362		0.1753	0.8022	12.8955	178.6331	0.1465		
	Median	14.00	12.40		7.50	1.00	61.00	313.00	0.00		
	# of samples	51	51		51	51	51	51	51		
		DO ave June through Sept.		9.87							
		DO Median (June-Sept.)		9.25							
		# of samples		22							
		DO Std		2.06							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
BC7	9/21/2002 0:00	22.7	20.2	7.35	7.25	0	56	296	0.1	0	Walt and Marion Partenheimer
BC7	11/2/2002 0:00	5	6	11.65	7	0.25	46	264	0	0	Walt and Marion Partenheimer
BC7	12/15/2002 0:00	5	5.5	11.25	6.75	0.25	30	196	0.04	0	Walt and Marion Partenheimer
BC7	1/11/2003 0:00	2.5	1	12.8	7	0	34	220	0	0	Walt & Marion Partenheimer
BC7	3/9/2003 0:00	4.5	5.5	12.5	7	1	20	143	0.04	0	Walt & Marion Partenheimer
BC7	4/12/2003 0:00	16.5	14.2	9.5	7	2	22	210	0	0	Walt & Marion Partenheimer
BC7	5/17/2003 0:00	9.3	10.2	10.4	7	2	31	246	0.1	0	Walt & Marion Partenheimer
BC7	6/22/2003 0:00	22.2	15	9.5	6.75	1	22	196	0.1	0	Walt & Marion Partenheimer
BC7	8/2/2003 0:00	24.5	22	8.4	7	1	40	264	0.04	0	Walt & Marion Partenheimer
BC7	9/28/2003 0:00	17.3	16.5	18.5	7	0	37	223	0	0	Walt & Marion Partenheimer
BC7	11/1/2003 0:00	19	15	9.5	7	0.25	30	197	0.1	0	Walt & Marion Partenheimer
BC7	12/13/2003 0:00	1	4.5	11.8	7	0.25	31	189	0.1	0	Walt & Marion Partenheimer
BC7	2/7/2004 0:00	4.5	3.4	12.5	6.5	0	24	151.4	0.1	0	Walt & Marion Partenheimer
BC7	3/27/2004 0:00	17.8	12.8	10.2	7	2	24	234	0.06	0	Walt & Marion Partenheimer
BC7	5/16/2004 0:00	22.4	18.8	8.8	7	2	29	252	0.18	0	Walt & Marion Partenheimer
BC7	6/12/2004 0:00	18.5	15.1	9.2	7	2	30	236	0.18	0	Walt & Marion Partenheimer
BC7	7/23/2004 0:00	23.8	20	8.1	7.25	2	39	260	260	0	Walt & Marion Partenheimer
BC7	8/29/2004 0:00	24	22	8.1	7	0.5	37	224	0.16	0	Walt & Marion Partenheimer
BC7	9/29/2004 0:00	17.1	16.9	9.1	7	1.5	23	158.3	0.14	0	Walt & Marion Partenheimer
BC7	10/27/2004 0:00	11.7	10.4	10.3	7	2	32	215	0.05	0	Walt & Marion Partenheimer
BC7	12/13/2004 0:00	5.8	7.2	11	7	2	29	189	0.06	0	Walt & Marion Partenheimer
BC7	2/27/2005 0:00	5	4.5	12.2	7	1.5	29	225	0.08	0	Walt & Marion Partenheimer
BC7	3/30/2005 0:00	12.5	11.5	8.7	7	3	23	174.2	0.08	0	Walt & Marion Partenheimer
BC7	5/7/2005 0:00	13.5	16	7.2	7	3	25	199.7	0.04	0	Walt & Marion Partenheimer
BC7	5/25/2005 0:00	18	15.2	7	7	2.5	31	245	0.04	0	Walt & Marion Partenheimer
BC7	8/9/2005 0:00	22	21.2	7.4	7	1.5	43	262	0	0	Walt and Marion Partenheimer
BC7	9/22/2005 0:00	22.6	18.6	7.1	7	1	43	284	0.09	0	Walt and Marion Parenheimer
BC7	10/29/2005 0:00	7.2	7	10.6	7	1	41	273	0.1	0	Walt & Marion Partenheimer
BC7	11/28/2005 0:00	27	10	8.9	7	2	35	278	0.04	0	Walt and Marion Partenheimer
BC7	1/19/2006 0:00	7.2	5.6	11.1	7	2	28	224	0	0	Walt and Marion Partenheimer
BC7	2/10/2006 0:00	3.5	3.8	9.8	7	1.5	25	236	0.02	0	Walt and Marion Partenheimer
BC7	10/4/2006 0:00	23.5	16	7.1	7.25	2	33	220	0.08	0.8	Charlotte Greenwalt
BC7	11/9/2006 0:00	14.5	12	7.9	6.75	1	30	170	0.04	0	Charlotte Greenwalt
BC7	6/28/2007 0:00	24.5	19	7.4	7.25	1	32	210	0.06	0	Charlotte Greenewalt
	MIN	1	1		6.5	0	20	143	0		
	MAX	27	22		7.25	3	56	296	260		
	AVE	14.59	12.43		6.99	1.32	31.88	222.49	7.71		
	STD	8.0578	6.1847		0.1441	0.8737	7.9115	38.7099	44.5781		
	Median	16.80	13.50		7.00	1.50	30.50	223.50	0.06		
	# of samples	34	34		34	34	34	34	34		
		DO ave June through Sept.		8.93							
		DO Median (June-Sept.)		8.10							
		# of samples		12							
		DO Std		3.13							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR1	9/22/2002 0:00	28	25	10.9	7.25	0.5	64	5080	0.08	0	Gary Grulich and Ginger Stein
CR1	10/27/2002 0:00	13	12.5	8.45	7.25	2	75	502	0.1	0	Gary Grulich and Ginger Stein
CR1	11/22/2002 0:00	9	8	9.75	7	3	68	260	0.06	0	Gary Grulich and Ginger Stein
CR1	12/21/2002 0:00	7.5	5	10.2	7	2	58	303	0.03	0	Gary Grulich
CR1	1/2/2004 0:00	11.5	5	12.2	7	3	71	315	0	0	G.Stein
CR1	2/14/2004 0:00	10	3.5	12.3	7	2	57	350	0.14	0	G.Grulich
CR1	3/27/2004 0:00	20	14	8.9	7.3	2	60	348	0.06	0	G.Grulich
CR1	4/29/2004 0:00	23.5	16	9	7.5	1	60	268	0.05	0	G.Grulich
CR1	5/29/2004 0:00	17.5	23	10.2	7.5	1.5	69	299	0.24	0	G.Grulich
CR1	6/27/2004 0:00	22	23.5	9.5	7.3	2	60	273	0.11	0	G.Grulich
CR1	7/22/2004 0:00	28	25	5.55	7.2	1.5	60	253	0.24	0	G.Grulich
CR1	8/28/2004 0:00	31	28.5	7.5	7.5	1	69	296	0.14	0	G.Grulich
CR1	9/22/2004 0:00	25.5	20	6.7	7	2	60	235	0.27	0	G. Grulich
CR1	11/18/2004 0:00	13	9.5	9.8	7.3	1	64	259	0.08	0	G. Grulich
CR1	12/17/2004 0:00	8.5	3.5	12.7	7.3	1	63	301	0.13	0	G.Grulich
CR1	1/13/2005 0:00	17	6.5	12	7	3	61	264	0.1	0	G. Grulich
CR1	3/6/2005 0:00	9	9.5	10	7	3	61	996	0.06	0	G.Grulich
CR1	4/7/2005 0:00	21	15	6.9	7	2	52	254	0.07	0	G.Grulich
CR1	5/20/2005 0:00	22	16.5	8.6	7.3	2.55	57	281	0.14	0	G. Grulich
CR1	6/22/2005 0:00	29	24.5	6.9	7.5	1	68	458	0.11	0	Gary Grulich
CR1	7/17/2005 0:00	31.5	27	3.9	7	0.5	59	246	0.13	0	Gary Grulich
CR1	8/11/2005 0:00	31	27.5	4.1	7	1	64	535	0.15	0	Gary Grulich
CR1	9/14/2005 0:00	25.5	24.5	6.1	7	1	61	2720	0.05	0	Gary Grulich
CR1	10/18/2005 0:00	21	17.5	9.4	7	2	58	276	0.1	0	Gary Grulich
CR1	11/29/2005 0:00	19.5	9.5	8.2	7	2	63	295	0.19	0	Gary Grulich
CR1	12/24/2005 0:00	8.5	3	8.9	7	3	62	393	0.11	0	Gary Grulich
CR1	1/20/2006 0:00	9.5	5	9.8	7	1	42	216	0.07	0	Gary Grulich
CR1	3/11/2006 0:00	19	12	9	7.25	3	60	395	0.07	12	Gary Grulich
CR1	4/20/2006 0:00	25	19	9	7.25	2	72	411	0.06	12	Gary Grulich
CR1	5/28/2006 0:00	28	22	7	7.25	1.5	63	400	0.06	12	Gary Grulich
CR1	7/4/2006 0:00	30	27	5	7	1	58	240	0.32	12	Gary Grulich
CR1	7/25/2006 0:00	32	28.5	6.6	7	1	56	230	0.2	0	Gary Grulich
CR1	8/21/2006 0:00	28	27	6.7	7.25	0.5	69	1080	0.06	0	Gary Grulich
CR1	9/30/2006 0:00	18	17	7.5	7.25	1	73	290	0.2	0	Gary Grulich
CR1	10/30/2006 0:00	16	10	9.7	7	1	52	190	0.13	0	Gary Grulich
CR1	12/17/2006 0:00	14	6	9.1	7	3	73	310	0.06	0	Gary Grulich
CR1	6/21/2007 0:00	23	24.5	0	7.25	6	68	340	0.1	0	Gary Grulich
	Min	7.5	3.0		7.0	0.5	42.0	190.0	0.0		
	Max	32	28.5		7.5	6	75	5080	0.32		
	Ave	20.15	16.24		7.15	1.83	62.43	544.92	0.12		
	Median	21.0	16.5		7.0	2.0	61.0	299.0	0.1		
	# of Samples	37	37		37	37	37	37	37		
	Std	7.7941	8.5778		0.1757	1.0760	6.7187	878.6419	0.0709		
		DO ave. June-Sept		6.69							
		DO median June-Sept		6.70							
		DO # samples June-Sept		13							
		DO Std June-Sept		1.9575							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR2	9/22/2002 0:00	24	25	9.8	7	0.5	60	4330	0.04	0	Gary Grulich and Ginger Stein
CR2	10/27/2002 0:00	11	11.5	8.4	7	2	67	430	0.06	0	Gary Grulich and Ginger Stein
CR2	11/22/2002 0:00	8.5	8.5	9.15	7	3	65	256	0	0	Ginger Stein and Gary Grulich
CR2	12/21/2002 0:00	7	6	9.7	6.75	1	36	220	0.02	0	Gary Grulich
CR2	3/19/2003 0:00	12.5	11	9.9	7	3	52	340	0.06	0	Ginger Stein, Gary Grulich
CR2	4/24/2003 0:00	14.5	14	9.6	7	1	38	301	0.09	0	G.Stein, G.Grulich
CR2	5/26/2003 0:00	17	15.1	8.25	0.04	0.5	33	165	0.04	0	G. Stein, G. Grulich
CR2	7/23/2003 0:00	29	6	9.25	7.5	1	61	317	0.06	0	G.Grulich
CR2	8/22/2003 0:00	35	28	9.6	7.5	1	65	290	0.05	0	G.Stein, G.Grulich
CR2	9/30/2003 0:00	22	18.5	0	6.5	1.5	29	166	0.06	0	G.Stein
CR2	10/17/2003 0:00	14.5	15	7.1	7	0.5	37	196	0.03	0	G.Grulich
CR2	11/18/2003 0:00	16.5	10	9.4	6.75	0.5	42	225	0.1	0	G. Grulich
CR2	1/2/2004 0:00	9	5	11.85	7	1.5	50	260	0	0	G. Stein
CR2	2/14/2004 0:00	10	4.5	12.6	7	1	33	395	0.1	0	G. Grulich
CR2	3/27/2004 0:00	19	14.5	9.95	7	1	41	330	0.07	0	G.Grulich
CR2	4/29/2004 0:00	24.5	18.5	7.7	7	0.5	37	243	0.13	0	G.Grulich
CR2	5/29/2004 0:00	19	22.5	10.2	7.5	1	67	302	0.2	0	G.Grulich
CR2	6/27/2004 0:00	23	23	6.4	7	0.5	41	226	0.22	0	G.Grulich
CR2	7/22/2004 0:00	29.5	25	4.9	7	0.5	41	187.8	0.36	0	G.Grulich
CR2	8/28/2004 0:00	31	27	7.4	7	0.5	0.18	62	0.18	0	G.Grulich
CR2	9/22/2004 0:00	25	19.5	5.85	7	0.5	40	182	0.25	0	G.Grulich
CR2	11/18/2004 0:00	13	9.5	9.9	7	0.5	47	201	0.08	0	G.Grulich
CR2	12/17/2004 0:00	8.5	4	12.4	7	0.5	44.5	236	0.09	0	G.Grulich
CR2	1/13/2005 0:00	15	7.5	11.45	7.3	3	63	293	0.1	0	G.Grulich
CR2	3/6/2005 0:00	9.5	4.5	10.4	7	1	39	1275	0.04	0	G.Grulich
CR2	4/7/2005 0:00	21	16	7.8	7	3	49	312	0.13	0	G.Grulich
CR2	5/20/2005 0:00	22	16	8.6	6.5	0.5	40	241	0.08	0	G.Grulich
CR2	6/22/2005 0:00	27	24	7.9	7.3	0.5	63	364	0.07	0	Gary Grulich
CR2	7/17/2005 0:00	32	27	4.3	7	0.5	41	245	0.12	0	Gary Grulich
CR2	8/11/2005 0:00	31	27.5	8.2	7	0.5	53	301	0.19	0	Gary Grulich
CR2	9/14/2005 0:00	25.5	24.5	4.8	7	0.5	64	1818	0.05	0	Gary Grulich
CR2	10/18/2005 0:00	20.5	16.5	9.5	7	1.5	50	317	0.09	0	Gary Grulich
CR2	11/29/2005 0:00	19.5	8	8.1	7.25	2	73	288	0.13	0	Gary Grulich
CR2	12/25/2005 0:00	9.5	2.5	9.4	6.5	1	35	366	0.06	0	Gary Grulich
CR2	1/20/2006 0:00	9.5	5	12.6	7	0.5	36	221	0.04	0	Gary Grulich
CR2	3/11/2006 0:00	20	13	12	7.25	2	64	401	0.1	12	Gary Grulich
CR2	4/20/2006 0:00	26	19	5	7	1	50	346	0.06	15	Gary Grulich
CR2	5/28/2006 0:00	29	23	7	7.5	1	63	390	0.09	12	Gary Grulich
CR2	7/4/2006 0:00	30	27	5	6.25	0.5	46	200	0.31	15	Gary Grulich
CR2	7/25/2006 0:00	33	27.5	6.3	7	0.5	57	210	0.19	0	Gary Grulich
CR2	8/21/2006 0:00	28	26.5	5.5	7	0.5	68	790	0.06	0	Gary Grulich
CR2	9/30/2006 0:00	17.5	16.5	7.2	7	1	48	240	0.16	0	Gary Grulich
CR2	10/30/2006 0:00	16	11	7.7	7	0.5	36	130	0.06	0	Gary Grulich
CR2	12/17/2006 0:00	12	6	9.7	7.25	2	53	280	0.06	0	Gary Grulich
CR2	6/21/2007 0:00	25	25	5.2	7.25	0.5	61	320	0.2	0	GaryGrulich
	Min	7.0	2.5	0.0	0.0	0.5	0.2	62.0	0.0		
	Max	35	28	9.8	7.5	3	73	4330	0.36		
	Ave	20.03	15.89		6.86	1.06	48.42	426.86	0.10		
	Median	20.0	16.0		7.0	1.0	48.0	288.0	0.1		
	# of Samples	45	45		45	45	45	45	45		
	Std	7.95	8.15		1.07	0.77	14.02	662.34	0.08		
		DO ave. June-Sept		6.33							
		DO median June-Sept		6.30							
		DO # samples June-Sept		17							
		DO Std June-Sept		2.3936							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR3	9/27/2002 0:00	26	19.8	8.25	6.5	0.5	34	172.8	0.1	0	Marty Currie and Karen McLachlan
CR3	10/25/2002 0:00	12	11.1	9.8	7	0.5	35	216	0	0	Marty Currie and Karen McLachlan
CR3	11/30/2002 0:00	5	4	12.85	7	1	36	225	0	0	Marty Currie and Karen McLachlan
CR3	3/26/2003 0:00	14	14.8	9.3	7	1	28	268	0	0	M.Currie, K.McLachlan
CR3	4/27/2003 0:00	27	20.6	8.7	7	0.5	28	261	0.01	0	M.Currie, K.McLachlan
CR3	5/30/2003 0:00	28	23.1	7.45	7	1	38	219	0	0	M.Currie,K.McLachlan
CR3	7/7/2003 0:00	34	28	6.3	7	1	36	219	0.24	0	M.Currie, K.McLachlan
CR3	8/7/2003 0:00	28	25.3	6.1	7	1	30	268	0.16	0	M.Currie,K.McLachlan
CR3	10/8/2003 0:00	23	16.5	8.9	7	0.25	38	249	0	0	M.Currie,K.McLachlan
CR3	12/12/2003 0:00	9	5.4	10.5	6.5	0	16	249	0	0	M.Currie,K.McLachlan
CR3	2/20/2004 0:00	10	5.4	12	7	0.5	29	338	0	0	M.Currie,K.McLachlan
CR3	7/2/2004 0:00	33	26.8	6	6.75	0.5	40	248	0.2	0	M.Currie, K.McLachlan
CR3	8/25/2004 0:00	25	24.4	6.65	7	1	40	241	0.25	0	M.Currie,K.McLachlan
CR3	9/24/2004 0:00	23	21.9	7.4	7	1	28	224	0.2	0	M.Currie,K.McLachlan
CR3	11/26/2004 0:00	7	14.5	9.8	7	0	38	215	0	0	M.Currie,K.McLachlan
CR3	2/12/2005 0:00	7	10.4	11.9	7	1	4	460	0	0	M.Currie,K.McLachlan
CR3	4/29/2005 0:00	19	15.5	7.5	7	2	28	280	0.1	0	M.Currie; K.McLachlan
CR3	6/30/2005 0:00	35	28.6	4.5	7	0.5	40	304	0.07	0	Marty Currie & Karen McLachlan
CR3	9/12/2005 0:00	30	24.6	7	7	0.5	44	299	0.15	0	Marty Currie & Karen McLachlan
CR3	1/13/2006 0:00	12	8	10.2	6.5	0.5	26	256	0	0	Marty Currie, Karen McLachlan
CR3	3/31/2006 0:00	23	16	8	7.5	1	40	334	0.1	0	Marty Currie and Karen McLachlan
CR3	6/9/2006 0:00	27	22	7	7	1	36	235	0.2	0	Marty Currie and Karen McLachlan
CR3	9/8/2006 0:00	36.5	24.1	4.8	7	0.5	28	153.3	0.2	0	Marty Currie and Karen McLachlan
CR3	6/8/2007 0:00	41.4	28.9	4.2	7	0.5	40	262	0.2	0	Marty Currie & Karen McLachlan
	Min	5	4	4.2	6	0	4	153.3	0		
	Max	41.4	28.9	8.25	7.5	2	44	460	0.25		
	Ave	22.29	18.32		6.91	0.71	32.50	258.17	0.09		
	Median	24.00	20.20		7.00	0.50	35.50	249.00	0.09		
	# of Samples	24	24		24	24	24	24	24		
	Std	10.55	7.81		0.28	0.43	8.84	61.04	0.09		
		DO ave. June-Sept		6.20							
		DO median June-Sept		6.30							
		DO # samples June-Sept		11							
		DO Std June-Sept		1.2663							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR4	9/27/2002 0:00	27	19.9	7.15	6.5	0.5	28	147.7	0.1	0	Marty Currie and Karen McLachlan
CR4	10/25/2002 0:00	12	9.7	9.4	7	1	36	259	0	0	Marty Currie and Karen McLachlan
CR4	11/30/2002 0:00	7	3.3	12	7	0.5	34	231	0	0	Marty Currie and Karen McLachlan
CR4	3/26/2003 0:00	13	12.5	9.9	7	1	28	263	0	0	M.Currie,K.McLachlan
CR4	4/27/2003 0:00	25.8	19.4	9.4	7	1	28	260	0	0	M.Currie,K.McLachlan
CR4	5/20/2003 0:00	27	18.5	7.25	7	1	40	239	0.1	0	M.Currie,K.McLachlan
CR4	7/7/2003 0:00	32.5	27.5	5.4	7	1	40	242	0.2	0	M.Currie,K.McLachlan
CR4	8/7/2003 0:00	28	24.4	5.8	7	1	40	249	0.2	0	M.Currie,K.McLachlan
CR4	10/8/2003 0:00	21	15.1	8.4	7	0.5	39	250	0	0	M.Currie,K.McLachlan
CR4	12/12/2003 0:00	5	5.4	10.3	6.5	0	20	242	0	0	M.Currie,K.McLachlan
CR4	2/20/2004 0:00	10	5.1	12.35	7	0.5	26	326	0	0	M.Currie,K.McLachlan
CR4	7/2/2004 0:00	36	25.3	6.8	7	1	40	268	0.14	0	M.Currie,K.McLachlan
CR4	8/25/2004 0:00	26	22.6	7.15	7	1	40	251	0.14	0	M.Currie,K.McLachlan
CR4	9/24/2004 0:00	24	20	7.35	7	2	32	235	0.1	0	M.Currie,K.McLachlan
CR4	11/26/2004 0:00	7.2	7.6	9.15	7	0.25	40	228	0	0	M.Currie,K.McLachlan
CR4	2/12/2005 0:00	8	4	12.3	7	1	24	442	0	0	M.Currie,K.McLachlan
CR4	4/29/2005 0:00	19	14.7	7.4	6.5	2	28	269	0.1	0	M.Currie,K.McLachlan
CR4	5/27/2005 0:00	29	18.4	6.3	7	2	40	261	0.14	0	M.Currie,K.McLachlan
CR4	6/30/2005 0:00	35.7	27.2	6.8	7	1	40	303	0.22	0	Marty Currie & Karen McLachlan
CR4	9/12/2005 0:00	29	22.8	6.9	7	1	44	339	0.14	0	Marty Currie & Karen McLachlan
CR4	1/13/2006 0:00	12	7.4	9.9	7	0.25	26	265	0	0	Marty Currie, Karen McLachlan
CR4	3/31/2006 0:00	24	15	9	7.5	1	40	325	0.1	1	Marty Currie and Karen McLachlan
CR4	6/9/2006 0:00	26	20	6	6.5	0.5	32	155	0	3	Marty Currie and Karen McLachlan
CR4	9/8/2006 0:00	29.4	22	5.1	7		28	177.9	0.2	0	Marty Currie and Karen McLachlan
	Min	5	3.3	5.1	6.5	0	20	147.7	0		
	Max	36	27.5	7.35	7.5	2	44	442	0.22		
	Ave	21.40	16.16		6.94	0.91	33.88	259.48	0.08		
	Median	24.90	18.45		7.00	1.00	35.00	255.00	0.10		
	# of Samples	24	24		24	23	24	24	24		
	Std	9.65	7.65		0.22	0.53	6.80	60.51	0.08		
		DO ave. June-Sept		6.45							
		DO median June-Sept		6.80							
		DO # samples June-Sept		10							
		DO Std June-Sept		0.80							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR5	2/2/2003 0:00	10	4	9.65	6.5	1	52	932	0.06	0	Ben Miller, Mike Craskey
CR5	3/16/2003 0:00	19	10	9.8	6.5	1	20	256	0.06	0	Ben Miller, Mike Craskey
CR5	9/20/2004 0:00	14	15	7.6	6.5	0.25	32	170	0.1	4	Sue and Marlee Zabriskie
CR5	10/25/2004 0:00	18	12	8.35	6.75	0.5	40	280	0	0	sue and Marlee Zabriskie
CR5	12/29/2004 0:00	6.4	2.6	11	6.5	0.75	37	230	0.06	3.5	Lucille Short and Ginger North
CR5	2/6/2005 0:00	11.5	3	10.9	6.75	0.5	25	700	0.08	0	Lucille Short & Julia Caldwell
CR5	3/6/2005 0:00	11	4	16.7	6.5	0.5	24	650	0.02	0	Lucille Short & Julia Caldwell
CR5	4/10/2005 0:00	20	15	13.5	6.5	0.5	26	250	5	0	Lucille Short & Julia Caldwell
CR5	6/5/2006 0:00	21	18	5	6.75	0.75	38	196	0.14	0	Caverly
CR5	7/20/2006 0:00	30.6	27	6.6	7	0.75	32	197	0.2	3	Caverly
CR5	8/20/2006 0:00	33	27	5	7	1	42	277	0.1	0	Caverly
CR5	9/21/2006 0:00	20.5	15.4	6.3	6.75	1.5	40	188.7	0.1	0	Caverly
CR5	10/25/2006 0:00	12	9	7.3	6.5	0.75	36	174	0.1	0	Caverly
	Min	6.4	2.6	5	6.5	0.25	20	170	0		
	Max	33	27	7.6	7	1.5	52	932	5		
	Ave	17.46	12.46		6.65	0.75	34.15	346.21	0.46		
	Median	18.00	12.00		6.50	0.75	36.00	250.00	0.10		
	# of Samples	13	13		13	13	13	13	13		
	Std	7.86	8.28		0.19	0.32	8.84	246.82	1.36		
		DO ave. June-Sept		6.10							
		DO median June-Sept		6.30							
		DO # samples June-Sept		5							
		DO Std June-Sept		1.1136							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR6	2/2/2003 0:00	7	1	12.4	6.5	2	12	214	0.07	0	Ben Miller, Mike Craskey
CR6	3/15/2003 0:00	11	7	10	6	2	10	257	0.06	0	Ben Miller
CR6	9/20/2004 0:00	18.5	15	7.8	6.5	0.63	32	200	0.17	1.5	Sue and Marlee Zabriskie
CR6	12/29/2004 0:00	8.4	5.8	10.4	6.5	0.75	32	220	0.04	1	Lucille Short & Ginger North
CR6	2/6/2005 0:00	16	5	11	6.5	0.5	23	470	0.1	1.2	Lucille Short & Julia Caldwell
CR6	3/6/2005 0:00	11	6	17.5	6.5	0.5	20	440	0.03	0	Lucille Short & Julia Caldwell
CR6	4/10/2005 0:00	23	16	15.1	6.5	1	30	250	5	0.9	Lucille Short & Julia Caldwell
CR6	6/5/2006 0:00	23	17	7	6.5	1	36	232	0.2	0	Caverly
CR6	7/20/2006 0:00	30.6	24.6	6.8	6.5	2	38	230	0.2	0	Caverly
CR6	8/20/2006 0:00	37	24	4.8	6.5	2	36	254	0.1	0	Caverly
CR6	9/21/2006 0:00	16	14.9	8.2	6.5	1.5	32	219	0.15	0	Caverly
CR6	10/25/2006 0:00	10	10	8	6.5	1	32	175	0.1	0	Caverly
	Min	7	1	4.8	6	0.5	10	175	0.03		
	Max	37	24.6	8.2	6.5	2	38	470	5		
	Ave	17.63	12.19		6.46	1.24	27.75	263.42	0.52		
	Median	16.00	12.45		6.50	1.00	32.00	231.00	0.10		
	# of Samples	12	12		12	12	12	12	12		
	Std	9.30	7.59		0.14	0.62	9.36	92.64	1.41		
		DO ave. June-Sept		6.92							
		DO median June-Sept		7.00							
		DO # samples June-Sept		5							
		DO Std June-Sept		1.3161							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR7	3/17/2003 0:00	17	13	8	7	0.5	40	297	0.08	0	Susanna Wingard; Emily Kauffman
CR7	4/12/2003 0:00	17	9	11	6.5	0.5	43	0	0.08	0	Emily Kauffman & Wildlife Con. Club
CR7	8/16/2004 0:00	25	22	7.4	7.5	1.5	40	0	0.06	0	Kristen Comolli & Lisa Vormwald
CR7	9/26/2004 0:00	20	19	8.9	7.5	0.75	38	292	0.14	0	Kristen Comolli & Lisa Vormwald
CR7	11/21/2004 0:00	13	12	9.5	7	0.25	42	251	0.14	0	Kristen Comolli & Lisa Vormwald
CR7	12/20/2004 0:00	-5	2	11	7	2	34	252	0.02	0	Kristen Comolli & Lisa Vormwald
CR7	1/31/2005 0:00	5	1	11.6	7	2	20	1013	0.06	0	Kristen Comolli & Lisa Vormwald
CR7	3/24/2005 0:00	9	6.9	10	6.75	0.25	12	320	0.1	0	Rebekka Schultz and Allison Sussman
CR7	4/29/2005 0:00	16.5	13.9	9.9	7.25	1	42	300	0.09	2	Alli Sussman and Bekka Schultz
CR7	5/22/2005 0:00	18.5	16	8.03	7.25	0.75	40	300	0.088	1	Rebekka Schultz & Allison Sussman
CR7	9/29/2005 0:00	20.5	19	7.4	6.75	0.5	37	370	6	1.5	Bekka Schultz & Alli Sussman
CR7	10/27/2005 0:00	12.7	10.2	10.3	6.75	1.5	30	240	0.08	1.5	Rebekka Schultz & Allison Sussman
CR7	11/30/2005 0:00	10.5	11	9.15	6.5	0.5	26	170	0.08	36	Bekka Schultz and Alli Sussman
CR7	1/26/2006 0:00	5	3	12.75	6.5	0.5	23	280	0.036	1.5	Rebekka Shultz and Allison Sussman
CR7	2/27/2006 0:00	5.5	3	13.25	6.75	2	30	350	0.04	1.5	Rebekka Schultz and Allison Sussman
CR7	3/20/2006 0:00	10	8	12	7.25	3	35	345	0.1	2	Bekka Schultz and Alli Sussman
CR7	4/26/2006 0:00	19	15	10	6.75	1.5	31	275	0.08	2	Bekka Schultz and Alli Sussman
CR7	5/22/2006 0:00	21	16	9	7.25	1.5	45	320	0.12	1	Bekka Schultz and Alli Sussman
CR7	6/25/2006 0:00	23	23	7	7.25	2	45	340	0.2	1	Bekka Schultz and Alli Sussman
CR7	7/31/2006 0:00	33.8	29	6.6	6.25	0.25	29	180	0.33	1.5	Bekka Schultz and Alli Sussman
CR7	8/30/2006 0:00	21	23	7.6	6.75	0.5	34	230	0.2	1.5	Bekka Schultz and Alli Sussman
CR7	9/27/2006 0:00	26.5	19	8.7	7.25	1	46	270	0.11	1.5	Bekka Schultz and Alli Sussman
CR7	10/29/2006 0:00	15	10	9	6.75	0.25	33	165	0.08	2.5	Bekka Schultz and Alli sussman
CR7	11/29/2006 0:00	17.5	10	9.4	7.25	0.5	37	270	0.1	2	Bekka Schultz and Alli Sussman
CR7	12/14/2006 0:00	10	8	10.4	7.25	1	35	280	0.06	1.5	Alli Sussman and Bekka Schultz
CR7	6/30/2007 0:00	25	21.5	7.4	7.5	2	43	300	0.12	0	Alli Sussman & Bekka Schultz
	Min	-5	1	6.6	6.25	0.25	12	0	0.02		
	Max	33.8	29	8.9	7.5	3	46	1013	6		
	Ave	15.8	13.2		7.0	1.1	35.0	285.0	0.3		
	Median	17.0	12.5		7.0	0.9	36.0	280.0	0.1		
	# of Samples	26	26		26	26	26	26	26		
	Std	8.27	7.32		0.35	0.75	8.31	174.40	1.16		
		DO ave. June-Sept		7.63							
		DO median June-Sept		7.40							
		DO # samples June-Sept		8							
		DO Std June-Sept		0.7906							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR8	3/17/2003 0:00	15	10	8.9	7	0.5	38	264	0.08	0	Susanna Wingard, Emily Kauffman
CR8	4/12/2003 0:00	0	0	10	7	0.5	55	0	0.08	0	Emily Kauffman & Wildlife Con. Club
CR8	4/6/2004 0:00	5.5	7	11	7	1.5	25	256	0.04	0	Lisa Vormwald, Gloria Cooke
CR8	8/16/2004 0:00	24	21	8.6	7.5	0.5	39	0	0.42	0	Kristen Comolli & Lisa Vormwald
CR8	9/26/2004 0:00	19	18	8.9	7	0.25	34	250	0.14	0	Kristen Comolli & Lisa Vormwald
CR8	11/21/2004 0:00	13	12	8.8	7	0.25	36	215	0.04	0	Kristen Comolli & Lisa Vormwald
CR8	12/20/2004 0:00	-5	2	12.3	6.5	2	29	202	0	0	Kristen Comolli & Lisa Vormwald
CR8	1/31/2005 0:00	4	1	11.8	7	2	26	439	0.06	0	Kristen Comolli & Lisa Vormwald
CR8	3/24/2005 0:00	7.5	7	10.9	6.5	0.25	18	290	0.08	0	Rebekka Schultz and Allison Sussman
CR8	4/29/2005 0:00	15	14	10.2	7.25	0.87	34	270	0.8	2.25	Alli Sussman and Bekka Schultz
CR8	5/22/2005 0:00	18	16	9.1	7.25	0.75	33	270	0.1	0	Rebekka Schultz & Allison Sussman
CR8	9/29/2005 0:00	19	18	8.1	7.25	0.25	44	360	0.14	2	Bekka Schultz & Alli Sussman
CR8	10/27/2005 0:00	11.7	10	10.6	6.5	0.25	32	250	0.08	0	Rebekka Schultz & Allison Sussman
CR8	11/30/2005 0:00	9	11.2	11.3	6.25	0.5	25	190	0.1	24	Bekka Schultz and Alli Sussman
CR8	1/16/2006 0:00	4	2.5	11.7	6.25	0.75	22.5	290	0.04	2.5	Rebekka Schultz and Allison Sussman
CR8	2/27/2006 0:00	1.5	2	14	6.75	2	26	320	0.05	0	Rebekka Schultz and Allison Sussman
CR8	3/20/2006 0:00	10	8	11	7.25	2	30	320	0.08	3	Bekka Schultz and Alli Sussman
CR8	4/26/2006 0:00	14	15	10	7.25	1	28	260	0.07	3	Bekka Schultz and Alli Sussman
CR8	5/22/2006 0:00	16	16	9	7.25	2	37	285	0.12	3	Bekka Schultz and Alli Sussman
CR8	6/25/2006 0:00	23	23	7	7.25	1.5	41	320	0.23	3	Bekka Schultz and Alli Sussman
CR8	7/31/2006 0:00	33	28	6.5	6.75	0.5	30	210	0.29	1.5	Bekka Schultz and Alli Sussman
CR8	8/30/2006 0:00	20	22	7.6	7.25	0.25	35	240	0.28	1.5	Bekka Schultz and Alli Sussman
CR8	9/27/2006 0:00	21	17.5	9.2	7.25	0.5	37	270	0.12	2	Bekka Schultz and Alli Sussman
CR8	10/29/2006 0:00	11	9.5	10.4	6.5	0.25	29	180	0.08	3.5	Bekka schultz and Alli Sussman
CR8	11/29/2006 0:00	14	11	10.4	7.25	0.5	29	260	0.12	2.5	Bekka Schultz and Alli Sussman
CR7	12/14/2006 0:00	10	8.5	11.5	7.25	0.5	27	260	0.08	2.5	Alli sussman and Bekka Schultz
CR8	6/30/2007 0:00	21.5	21	8.1	7.25	2	41	285	0.16	0	Alli Sussman & Bekka Schultz
	Min	-5	0	6.5	6.25	0.25	18	0	0.00		
	Max	33	28	9.2	7.50	2	55	439	0.80		
	Ave	13.1	12.3		6.98	0.9	33	250	0.14		
	Median	14.0	11.2		7.00	0.5	32	260	0.08		
	# of Samples	27	27		27	27	27	27	27		
	Std	8.40	7.43		0.3530	0.69	7.66	89.58	0.1597		
		DO ave. June-Sept		8.0							
		DO median June-Sept		8.1							
		DO # samples June-Sept		8							
		DO Std June-Sept		0.93							

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
CR9	3/28/2003 0:00	18.5	13.1	8.65	7.6	2	64	237.7		0	Gyula Pasztor
CR9	4/22/2003 0:00	14	11.4	10	7.3	2	52	224.6	0.03	0	Gyula Pasztor
CR9	6/26/2003 0:00	32	22.7	6.7	7.3	0	64	236.6	0.3	0	Gyula Pasztor
CR9	7/29/2003 0:00	27	27.1	6.1	7.5	1.5	68	335.7	0.36	0	Gyula Pasztor
CR9	8/29/2003 0:00	29	27	5.22	7.25	2	68	388.5	1.8	0	Gyula Pasztor
CR9	10/29/2004 0:00	15.7	13	5.8		0	62	238.4		0	Dan Shay
CR9	11/24/2004 0:00	19.5	13.3	7.9	7.5	2	66	363.7	0.3	0	Dan Shay
CR9	12/22/2004 0:00	3	4.1	15.6	8	1	50		0.21	0	Dan Shay
CR9	9/24/2004 0:00	22.8				1	56			0	Daniel Shay
CR9	1/31/2005 0:00	4.4	0.7	11	6.5	0.5	72.5	151.7	0.05	0	Daniel Shay
CR9	3/2/2005 0:00	0.56		11.3	8.5	0.75	68.5	153.2		0	Daniel Shay
CR9	4/29/2005 0:00		14.4	8.3	7.3	1.25	60	206.4		0	Trevor Alexander
CR9	5/31/2005 0:00	23.9	20.4	7.4	7.75	1.5	75	426.7		0	Trevor Alexander
CR9	6/30/2005 0:00		27.1	5.2	7.5	2	60	944		0	Trevor Alexander
CR9	1/31/2006 0:00	3	5	13	7.25	1	60	120		24	
CR9	10/5/2006 0:00		19.6			2	70	333	0.5	0	Rosette and Drew
CR9	6/6/2007 0:00		23	4.6		0	59	343.3	0.1	0	Austin Gee, Shishir Bankapur & Bob Schroeder
	Min	0.6	0.7	4.6	6.5	0.0	50.0	120.0	0.0		
	Max	32.0	27.1	6.7	8.5	2.0	75.0	944.0	1.8		
	Ave	16.4	16.1		7.5	1.2	63.2	313.6	0.4		
	Median	18.5	14.4		7.5	1.3	64.0	238.4	0.3		
	# of Samples	13	15		13	17	17	15	9		
	Std	10.75	8.61		0.46	0.76	6.88	197.53	0.55		
		DO ave. June-Sept		5.6							
		DO median June-Sept		5.2							
		DO # samples June-Sept		5							
		DO Std June-Sept		0.83							

No. 241 Tantrough Trench (Outlet) (Abbott's Pond Rd at County line)											
MSP241											
Tantrough Branch											
75 28 05 W											
38 53 23 N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
MSP241	6/14/2005 0:00	31	22	6.3	6.5	7	16	150	0.1	0	Nora Childers & Barbara Tucker
MSP241	8/20/2005 0:00	25	18.5	7.1	6.5	4	18	150	5	0	Nora Childers & Barbara Tucker
MSP241	9/2/2005 0:00	22	18	7.4	6.5	6	12	150	0.1	0	Nora Childers & Barbara Tucker
MSP241	2/2/2006 0:00	14.2	10.5	7.8	6	3	24	170	0.65	0	Stephen and Nora Childers
MSP241	3/11/2006 0:00	18	14	8.2	6	3	12	160	0.1	0	Stephen & Nora Childers
MSP241	4/21/2006 0:00	14.5	14.1	9.1	6.5	8	16	160	0.08	0	Stephen & Nora Childers
MSP241	8/19/2006 0:00	30.5	19.5	6.7	6.5	10	16	150	0.1	0	Stephan and Nora Childers
MSP241	9/22/2006 0:00	24.2	16.7	7.5	6.5	7	16	120	0.06	0	Stephen and Nora Childers
MSP241	11/16/2006 0:00	20.9	15	7.4	6	5	18	140	0	0	Childers
MSP241	12/19/2006 0:00	8.5	9.3	10.4	6	6	12	160	0.02	0	Stephen and Nora Childers
	Min	8.5	9.3	6.3	6.00	3.00	12	120	0.00		
	Max	31.0	22.0	7.5	6.50	10.00	24	170	5.00		
	Ave	20.9	15.8		6.30	5.90	16	151	0.62		
	Median	21.5	15.9		6.50	6.00	16	150	0.10		
	#ofSamples	10	10		10	10	10	10	10		
	Std	6.13	3.46		0.2500	2.3688	3.57	14.14	1.6285		
		DO ave. June - Sept		7.0							
		Median		7.1							
		#of Samples		5							
		DO std. June - Sept		0.50							

MSP261											
Johnson's Branch											
75 28 40 W											
38 50 10 N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
MSP261	6/14/2005 0:00	35	24	5	6.5	4	22	130	0.08	0	Nora Childers & Barbara Tucker
MSP261	8/20/2005 0:00	27	22.5	6.5	6.5	2.5	24	120	6.5	0	Nora Childers & Barbara Tucker
MSP261	9/26/2005 0:00	22.5	18	6.8	6	3	18	140	0.1	0	Nora Childers & Barbara Tucker
MSP261	2/2/2006 0:00	14	9.5	7.9	6	0.75	24	140	0.1	0	Steph and Nora Childers
MSP261	3/11/2006 0:00	20	14	8.4	6.5	3	19	130	0.08	0	Nora & Stephen Childers
MSP261	4/21/2006 0:00	19.3	16.5	8.4	6.5	3	16	130	0.08	0	Stephen & Nora Childers
MSP261	8/19/2006 0:00	33.2	20.7	5.9	6.5	3	20	120	0.1	0	Stephen and Nora Childers
MSP261	9/22/2006 0:00	24.2	16.9	7.5	6.5	3	20		0.06	0	Stephen and Nora Childers
MSP261	11/16/2006 0:00	22.7	15	6	6.5	3	20	120	0	0	Childers
MSP261	12/19/2006 0:00	12.5	9.7	10.4	6.5	4	16	130	0.12	0	Stephen and Nora Childers
	Min	12.5	9.5	5	6.00	0.75	16	120	0.00		
	Max	35.0	24.0	10.4	6.50	4.00	24	140	6.50		
	Ave	23.0	16.7		6.40	2.93	20	129	0.72		
	Median	22.6	16.7		6.50	3.00	20	130	0.09		
	#ofSamples	10	10		10	10	10	9	10		
	Std	7.30	4.90		0.2108	0.8979	2.85	7.82	2.0304		
		DO ave. June - Sept		7.75							
		Median		7.95							
		#of Samples		8							
		DO std. June - Sept		2.035400978							

MSP261											
Johnson's Branch											
75 28 40 W											
38 50 10 N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
MSP281	6/10/2005 0:00	28	26	2.9	6	0	28	210	0	0	Carl & Helen Swanson
MSP281	7/14/2005 0:00	27	26	3.1	6	0	48	990	0	0	Carl & Helen Swanson
MSP281	8/15/2005 0:00	32	31	6	6.5	0	32	770	0	0	Carl & Helen Swanson
MSP281	9/12/2005 0:00	26.5	22.5	3.5	7	0	120	0	0	0	Carl & Helen Swanson
MSP281	10/20/2005 0:00	16	0	10	6	0	30	1550	0	0	Carl Swanson
MSP281	11/15/2005 0:00	23	18	6.25	6	0	23	440	0	0	Carl Swanson
MSP281	12/28/2005 0:00	12	6	8	6	0	12	80	0	0	Carl Swanson
MSP281	1/20/2006 0:00	12	5.2	7.4	6	0	8	80	0	0	Carl Swanson
MSP281	4/21/2006 0:00	17	16	4	6	0	20	350	0	0	Carl Swanson
MSP281	5/29/2006 0:00	30	28	2.7	6.5	0	58	0	0	0	Carl Swanson
MSP281	8/14/2006 0:00	30	24.6	7.8	6.5		88	0	0	0	Carl Swanson
MSP281	9/13/2006 0:00	24	21	5	6		24	0	0	0	Carl Swanson
MSP281	10/19/2006 0:00	21.5	18	6	6.5		26	0	0	0	Carl Swanson
MSP281	11/21/2006 0:00	9	7	11.6	6		20	670	0	0	Carl Swanson
MSP281	12/18/2006 0:00	18	8	6.9	6		0	350	0	0	Carl Swanson
MSP281	6/16/2007 0:00	22	21.9	1.9	6.5	0	80	0	0	0	Carl Swanson
	Min	9.0	0.0	1.9	6.00	0.00	0	0	0.00		
	Max	32.0	31.0	7.8	7.00	0.00	88	670	0.00		
	Ave	21.8	17.5		6.22	0.00	34	153	0.00		
	Median	22.5	19.5		6.00	0.00	22	40	0.00		
	#ofSamples	16	16		16	11	10	10	16		
	Std	7.12	9.44		0.3146	0.0000	30.69	229.16	0.0000		
		DO ave. June - Sept		4.3							
		Median		3.5							
		#of Samples		7							
		DO std. June - Sept		2.06							

MSP291											
Fishing Branch											
75 24 39 W											
38 57 40 N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
MSP291	6/26/2005 0:00	28	28	6.4	7	1	46	1990	0.2	0	Michelle Manson & Bill Keddie
MSP291	7/28/2005 0:00	27	30	7.6	7	0.25	82	1900	0.1	0	Michelle Manson & Bill Keddie
MSP291	8/27/2005 0:00	25.7	22.3	8.8	7	2	56	1900	0.2	0	Bill Keddie
MSP291	9/27/2005 0:00	20	22	8.6	7	1	52	1900	0.1	0	Bill Keddie
MSP291	10/28/2005 0:00	9	12	10.85	7	0.75	44	1990	0.1	0	Bill Keddie
MSP291	11/27/2005 0:00	11	6	11.35	7	3	40	570	0.1	0	bill Keddie
MSP291	12/26/2005 0:00	7	4.5	10.7	6.5	6	28	640	0.1	0	Bill Keddie and Michelle Manson
MSP291	1/26/2006 0:00	2	2	10.7	7	5	24	260	0.02	0	Bill Keddie
MSP291	2/23/2006 0:00	5	4	10.7	7	5	34	1990	0.04	0	Bill Keddie
MSP291	3/25/2006 0:00	6.5	8.4	9.7	7	3	36	1990	0.06	0	Bill Keddie
MSP291	4/25/2006 0:00	24	21.6	7.8	7		36	1990	0.08	0	Bill Keddie
MSP291	5/24/2006 0:00	21	19	7.7	7	3	50	1990	0.04	0	Bill Keddie
MSP291	6/26/2006 0:00	28	25	6.4	6.5	0.5	38	1990	6.5	0	Bill Kellie
MSP291	7/26/2006 0:00	31	29	6.1	7	0.5	48	1170	0.2	0	Bill Keddie
MSP291	8/25/2006 0:00	30.5	28	6.1	7.5		83	1990	0.1	0	Bill Keddie
MSP291	9/25/2006 0:00	26	22.5	7.7	7.5	1	62	1900	0.06	0	Bill Keddie
MSP291	10/27/2006 0:00	9	10	9.7	7.5	0.5	56	1900	0.04	0	Bill Keddie
MSP291	11/26/2006 0:00	12	9	10.5	7	2	40	1990	0.04	0	Bill Keddie
MSP291	12/21/2006 0:00	10	8	10.2	7	3	32	0	0.08	0	William Keddie
MSP291	6/26/2007 0:00	30	25	5.1	7	3	46	1630	0	0	Bill Keddie
	Min	2.0	2.0	5.1	6.50	0.25	24	0	0.00		
	Max	31.0	30.0	8.8	7.50	6.00	83	1990	6.50		
	Ave	18.1	16.8		7.03	2.25	47	1584	0.41		
	Median	20.5	20.3		7.00	2.00	45	1900	0.09		
	#ofSamples	20	20		20	18	20	20	20		
	Std	10.03	9.61		0.2552	1.7531	15.66	662.44	1.4350		
		DO ave. June - Sept		6.977777778							
		Median		6.4							
		#of Samples		9							
		DO std. June - Sept		1.254768682							

MSP301											
Swan Creek											
75 25 38 W											
38 56 33 N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
	11/10/2003	15.5	11	7.6	7	2	100	180	0.2		Greg Scott/Courtney Wooldridge
	12/22/2003	8	4	14	7	4	20	250	0		Courtney Wooldridge/Gregg Scott
	2/9/2004	8	4	5.5	6.5		20	170			Greg Scott/Courtney Wooldridge/Brandon Shoc
	3/2/2004	25.5		4.2	7.5	4	40	220			Courtney Wooldridge/Gregg Scott/Milford HS
	4/1/2004	15	17	4	9	1	60	200	1		Courtney Wooldridge/Gregg Scott
	5/4/2004	24		4	7	8	120	240	0.1		Greg Scott/Brandon Shockley
	6/22/2004	30	23	7.5	7.5		50	220	0		Courtney Wooldridge
MSP301	10/13/2004 0:00	17.8	12.2	6	6.5	4	38	220	0	0	Gregg Scott
MSP301	9/27/2005 0:00	27	26	0.8	7	1	100	180	0	0	Gregg Scott
MSP301	11/21/2005 0:00	7	7	5.5	6.75	6	35	200	0.08	0	Brandon Dodd and Josh Scott
MSP301	1/24/2006 0:00	5	4	7.4	6.75	0.25	20	120	0.26	0	Josh Scott and Brandon Dodd
MSP301	3/9/2006 0:00	7.7	6.1	8.5	7	5	39	150	0.06	0	Josh Scott
MSP301	4/25/2006 0:00	0	17.7	8.6	8.5	3	28	190	0.76	0	Josh Scott
	Min	0.0	4.0	0.8	6.50	0.25	20	120	0.00		
	Max	30.0	26.0	7.5	9.00	8.00	120	250	1.00		
	Ave	14.7	12.0		7.23	3.48	52	195	0.22		
	Median	15.0	11.0		7.00	4.00	39	200	0.08		
	#ofSamples	13	11		13	11	13	13	11		
	Std	9.61	7.92		0.7463	2.3464	33.84	36.20	0.3399		
		DO ave. June - Sept		4.2							
		Median		4.2							
		#of Samples		2							
		DO std. June - Sept		4.74							

P1											
Pike Creek @ foot bridge across Crossan											
75 23 35 W											
39 45 20 N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
P1	6/5/2005 0:00	26	23	7.3	7	4	48	210	0.02	1	Lori Brozek/Jennifer Handlin
P1	7/26/2005 0:00	32	26	6	7	1	53	210	0.1	1.2	Lori Brozek/Jennifer Handlin
P1	9/4/2005 0:00	26	19	6.4	7	0.25	63	230	0.1	1.3	Lori Brozek/Jennifer Handlin
P1	10/17/2005 0:00	18	15	8	7	0.25	40	200	0.1	0	Jennifer Handlin
P1	11/26/2005 0:00	14	6	11.1	7	6	42	200	0	1.4	Jennifer Handlin and Lori Brozek
P1	12/27/2005 0:00	5.5	11.2	9.5	7.25	3	43	255	0.14	0	Julie San Miquel
P1	1/8/2006 0:00	6	5.5	11.7	7	6	44	180	0	1.4	Jennifer Handlin and Lori Brozek
P1	2/11/2006 0:00	8	5.3	10.1	7	6	44	170	0	1	Jennifer Handlin and Lori Brozek
P1	4/4/2006 0:00	15	10	8.5	7	4	58	200	0	0	Jennifer Handlin & Lori Brozek
P1	5/15/2006 0:00	18.5	16	9.2	7	3	48	190	0	0	Lori Brozek & Jennifer Handlin
P1	8/6/2006 0:00	26.5	21	7	7	1	56	190	0.1	0.8	Jennifer Handlin and Lori Brozek
P1	9/17/2006 0:00	23	19	7.8	7	2	46	160	0.2	1.1	Lori Brozek and Jennifer Handlin
	Min	5.5	5.3	6.0	7.00	0.25	40	160	0.00		
	Max	32.0	26.0	11.7	7.25	6.00	63	255	0.20		
	Ave	18.2	14.8		7.02	3.04	49	200	0.06		
	Median	18.3	15.5		7.00	3.00	47	200	0.06		
	#ofSamples	12	12		12	12	12	12	12		
	Std	9.06	7.34		0.0754	2.2786	7.48	23.48	0.0561		
		DO ave. June - Sept		6.9							
		Median		7.0							
		#of Samples		5							
		DO std. June - Sept		0.71							

P2											
Pike Creek @Beech Hill Entrance											
75 43 26 W											
39 45 07 N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
P2	6/11/2005 0:00	28.5	20.5	6.8	6.75	2	44	270	0.14	2	Bob Barrott/KathyGraham
P2	7/9/2005 0:00	25.5	19.5	7.6	7.25	0.5	52	0	0.1	2	Bob Barrott/KathyGraham
P2	8/13/2005 0:00	31	24.5	7.4	6.75	3.5	46	270	0.18	2	Bob Barrott/KathyGraham
P2	9/24/2005 0:00	22	19	8.8	6.75	3.75	68	270	0.14	2	Bob Barrott/KathyGraham
P2	10/29/2005 0:00	9	9	10.3	7.25	2.5	54	260	0.08	2.42	jBob Barrott, Kathy Graham
P2	11/12/2005 0:00	12.5	9	10.4	7.25	3	55	280	0.06	2.33	Bob Barrett and Kathy Graham
P2	12/10/2005 0:00	3	3.5	12.1	7.25	3	50	280	0.06	2.4	Bob Barrett and Kathy Graham
P2	1/21/2006 0:00	14.5	7.5	10.5	7.25	2	50	260	0.08	2.25	Bob Barrett and Kathy Graham
P2	2/25/2006 0:00	11.5	6.5	12.4	7	4.5	46	260	0.1	0	Bob Barrett, Kathy Graham
P2	3/11/2006 0:00	19.5	12.5	10.2	7.25	4	42	260	0.08	0	Bob Barrett, Kathy Graham
P2	4/8/2006 0:00	7	10	9.3	7	2	38	180	0.16	0	Bob Barrett & Kathy Graham
P2	5/13/2006 0:00	22	15.5	0	7	3	52	250	0.1	0	Bob Barrett; Kathy Graham
P2	6/10/2006 0:00	16.5	16	8.5	7	3	58	250	0.18	0	Bob Barrett; Kathy Graham
P2	7/8/2006 0:00	23.5	19	8	7	3	54	250	0.16	2.3	Robert Barrett
P2	8/19/2006 0:00	25.5	22	6.9	6.75	4	56	260	0.18	1.91	Bob Barrett and Kathy Graham
P2	9/23/2006 0:00	21.5	17	8.7	7	4	50	270	0.2	2.4	Bob Barrett and Kathy Graham
P2	11/11/2006 0:00	20.5	13.5	9.1	7.25	3	56	240	0.11	0	Bob Barrett and Kathy Graham
P2	12/16/2006 0:00	9.5	8	10.8	7.25	0.5	51	270	0.02	1.7	Bob Barrett and Kathy Graham
P2	6/9/2007 0:00	27	20.5	12.5	7.5	7	46	260	0.18	0	Robert Barrett
	Min	3.0	3.5	6.8	6.75	0.50	38	0	0.02		
	Max	31.0	24.5	12.5	7.50	7.00	68	280	0.20		
	Ave	18.2	14.0		7.10	3.33	50	251	0.13		
	Median	20.5	15.5		7.00	3.00	51	260	0.11		
	#ofSamples	19	19		19	19	19	19	19		
	Std	7.95	6.08		0.2213	1.4478	6.67	62.92	0.0517		
		DO ave. June - Sept		8.4							
		Median		8.0							
		#of Samples		9							
		DO std. June - Sept		1.72							

P3											
Pike Creek @3 Little Bakers Golf Club Restoration Area											
75 42 00 W											
39 44 02 N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
P3	7/21/2005 0:00	31.5	25.2	8.5	8	3.5	92	310	0.1	0	Scott Brandt/Ashley Addison
P3	8/24/2005 0:00	2.7	22	8.5	8	2	110	320	0.12	0	Scott Brandt/Ashley Addison
P3	9/23/2005 0:00	26.2	23.1	8.9	8	1	110	320	0.08	0	Scott Brandt/Ashley Addison
P3	4/28/2006 0:00	18	14.9	9.5	7.5	5	78	270	0.04	0	Heather Books & Ginger North
P3	6/12/2006 0:00	19	16.5	11.4	7.75	5	94	270	0.06	0	Heather Brooks
P3	7/8/2006 0:00	33.5	20.8	9.8	8.5	4	86	270	0.1	1.2	Heather Brooks
P3	8/10/2006 0:00	27	23.9	9.2	7.5	3	104	310	0.14	1.3	Heather Brooks
P3	9/13/2006 0:00	20	17.5	9.9	7.5	4	96	300	0.6	0.8	Heather Brooks
P3	10/16/2006 0:00	18	13	11.3	8	2	95	290	0.1	1.2	Heather Brooks
P3	11/19/2006 0:00	9	9.5	11.2	7.25	0.5	80	280	0.9	1.3	Heather Brooks
P3	1/29/2007 0:00	0	4.1	11.9	7.5	0.25	76	290	0	1.3	Heather Brooks
	Min	0.0	4.1	8.5	7.25	0.25	76	270	0.00		
	Max	33.5	25.2	11.4	8.50	5.00	110	320	0.90		
	Ave	18.6	17.3		7.77	2.75	93	294	0.20		
	Median	19.0	17.5		7.75	3.00	94	290	0.10		
	#ofSamples	11	11		11	11	11	11	11		
	Std	11.00	6.59		0.3615	1.7139	12.02	19.63	0.2810		
		DO ave. June - Sept		9.5							
		Median		9.2							
		#of Samples		7							
		DO std. June - Sept		1.02							

#1 Burrows Run just above state line. Sample from field, south side of											
stream, just upstream from the bridge at Center Mill Rd. Park off the											
road by the bridge. (Michael & Janet Elling, 440 Burnt Mill Rd, live in the											
house at the corner of Center Mill & Burnt Mill Rds on the north side of											
the stream; phone 388-6650).Permission granted by Harold S. Shutt, Jr.,											
owner of the fields; call Linda if you need to contact Mr. Shutt.											
Long 75 39'05"W Lat 39 50'09"N											
RCC1	12/30/2002 0:00	7	3.5	12.3	7.4	3	68	200	0	0	Jenny Short & David Pragoff
RCC1	3/16/2003 0:00	21.5	9.5	11.6	7.5	3	60	0	0.08	0	Jenny Short
RCC1	4/24/2003 0:00	16	12	12	7.5	3	66	200	0.06	0	Jenny Short
RCC1	5/28/2003 0:00	16	13	9.9	7.5	3	72	220	0.1	0	Jenny Short
RCC1	7/18/2003 0:00	24.5	17	8.8	7.4	4	74	0	0	0	Jenny Short
RCC1	9/4/2003 0:00	21	19	7.9	7.3	1	65	230	0.35	0	Jenny Short
RCC1	10/15/2003 0:00	16	14	9.3	7.4	0.5	67	190	0.16	0.23	Jenny Short
RCC1	11/17/2003 0:00	14.5	11	11.5	7.5	0.4	63	210	0.08	0	Jenny Short
RCC1	3/14/2004 0:00	5	4.5	13	7.25	2	55	180	0	0	David Pregoff
RCC1	5/23/2004 0:00	25	18	8.7	7.5	3	63	220	0.17	0	David Pragoff
RCC1	6/27/2004 0:00	19	14.5	8.75	7.5	2	68	220	0.11	0	David Pragoff and Meredith Perny
RCC1	3/11/2005 0:00	6.6	3.6	12.1	7.5	1	58	240	0.02	0.75	Marlee & Sue Zabriskie
RCC1	7/25/2005 0:00	28	21	8.1	7.5	1.75	60	240	0.02	0.75	Marlee and Sue Zabriskie
RCC1	9/12/2005 0:00	30	19	7.9	7.5	2	66	270	0.02	0	Marlee & Sue Zabriskie
RCC1	11/14/2005 0:00	20	11	7.3	7.25	2	77	260	0	0.913	Marlee and Sue Zabriskie
RCC1	1/16/2006 0:00	-0.5	4	8	7.25	2	62	240	0	0.833	Marlee and Sue Zabriskie
RCC1	9/17/2006 0:00	19.9	18.4	7.6	7.25	2	62	250	0.2	0.66	Marlee & Sue Zabriskie
RCC1	11/11/2006 0:00	23	13	10.4	7.25	2	62	240	0	0.6	Marlee & Sue Zabriskie
RCC1	5/25/2007 0:00	25	16.4	7.5	7.5	4	66	250	0.1	0	Richard Morelli/Pamela Stephani
RCC1	7/4/2007 0:00	22	16.7	8.5	7.5	3	68	260	0.04	0	Richard Morelli/Pamela Stephani
	Min	-0.5	3.5	7.6	7.25	0.40	55	0	0.00		
	Max	30.0	21.0	8.8	7.50	4.00	77	270	0.35		
	Ave	18.0	13.0		7.41	2.23	65	206	0.08		
	Median	20.0	13.5		7.50	2.00	66	225	0.05		
	# of samples	20	20		20	20	20	20	20		
	Std	8.08	5.56		0.1099	1.0206	5.34	74.51	0.0901		
		DO ave. June - Sept		8.2							
		DO Median June- Sept		8.1							
		# of samples		7							
		DO Std		0.47							

#2 Burrows Run at bridge on Old Kennett Pike. Sample from the arched foot bridge. (Go down the hill into the stream valley from the parking lot and walk upstream to bridge.) Park in parking area at entrance. Be sure to find the combination to the lock at entrance.

Long 75 38'31"W Lat 39 49'01"N

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
RCC2	9/21/2002 0:00	27.5	23	10.1	8	1	82	258	0.01	0	Walt and Marion Partenheimer
RCC2	11/2/2002 0:00	7.5	6.5	11.5	7.5	0.25	66	245	0	0	Walt and Marion Partenheimer
RCC2	12/15/2002 0:00	7.5	5.5	11.4	7.25	0.25	51	182.2	0.06	0	Walt and Marion Partenheimer
RCC2	1/11/2003 0:00	-2	0.8	13.8	7.5	0	54	227	0	0	Walt and Marion Partenheimer
RCC2	3/9/2003 0:00	6	5	3	7	0.5	24	105.8	0.16	0	Walt and Marion Partenheimer
RCC2	4/12/2003 0:00	18	13	11.1	7.5	2	49	186.4	0.12	0	Walt and Marion Partenheimer
RCC2	5/17/2003 0:00	11.5	11	11.7	7.5	3	57	223	0.08	0	Walt and Marion Partenheimer
RCC2	6/22/2003 0:00	21.3	17.2	9.3	7	2	50	8	0.1	0	Walt and Marion Partenheimer
RCC2	8/2/2003 0:00	28.8	24	9	7.5	0.5	64	24.7	0	0	Walt and Marion Partenheimer
RCC2	9/28/2003 0:00	21	0	8.7	7.5	0.025	61	202	0	0	Walt and Marion Partenheimer
RCC2	11/1/2003 0:00	26.5	15	10.5	7.5	0.25	58	195.1	0	0	Walt and Marion Partenheimer
RCC2	12/13/2003 0:00	4.5	2.2	12.7	7.5	0.25	50	204	0.3	0	Walt and Marion Partenheimer
RCC2	2/7/2004 0:00	4.8	3.8	13.1	7	0	30	155.8	0.01	0	Walt & Marion Partenheimer
RCC2	3/27/2004 0:00	17.5	13.5	10	7.5	2.4	50	0	0.1	0	Walt & Marion Partenheimer
RCC2	4/17/2004 0:00	14.2	10	11.4	8	2	48	217	0.26	0	Walt & Marion Partenheimer
RCC2	5/16/2004 0:00	30	21	9.7	8	2	58	238	0.16	0	Walt and Marion Partenheimer
RCC2	6/12/2004 0:00	23.8	18.5	8.95	7.75	2	60	227	0.1	0	Walt and Marion Partenheimer
RCC2	7/23/2004 0:00	29	21.1	9.2	8	2	64	248	0.1	0	Walt and Marion Partenheimer
RCC2	8/28/2004 0:00	31	22.5	9.4	8	0.5	65	230	0.18	0	Walt and Marion Partenheimer
RCC2	9/29/2004 0:00	20	18.2	86.5	7	1	37	127	0.1	0	Walt and Marion Partenheimer
RCC2	10/27/2004 0:00	14.3	10.5	10.6	7.5	2	61	220	0.1	0	Walt and Marion Partenheimer
RCC2	12/13/2004 0:00	7.5	7.4	12.2	7.5	2	56	195.5	0.1	0	Walt and Marion Partenheimer
RCC2	1/31/2005 0:00	3.5	3	13.2	7.5	2	58	227	0.1	0	Walt and Marion Partenheimer
RCC2	2/27/2005 0:00	1.5	4.2	12.6	7	2	50	259	0.1	0	Walt and Marion Partenheimer
RCC2	3/30/2005 0:00	17.2	11.5	8.8	7.5	2	44	222	0.06	0	Walt and Marion Partenheimer
RCC2	5/7/2005 0:00	19.7	14.9	8	7.5	3	53	209	0	0	Walt and Marion Partenheimer
RCC2	5/27/2005 0:00	23.5	18	8.8	7.5	2.5	61	235	0.06	0	Walt and Marion Partenheimer
RCC2	8/9/2005 0:00	27	21.8	7.6	7.5	2	63	231	0.16	0	Walt and Marion Partenheimer
RCC2	9/22/2005 0:00	29.2	20	8.2	8	2	80	247	0.04	0	Walt and Marion Partenheimer
RCC2	10/29/2005 0:00	12.5	8.3	9.8	7.5	1	65	232	0.08	0	Walt & Marion Partenheimer
RCC2	11/28/2005 0:00	27.3	10.7	9.2	7.5	2	60	233	0.08	0	Walt and Marion Partenheimer
RCC2	12/17/2005 0:00	6.8	4.3	9.7	7	1	44	260	0.02	0	Walt and Marion Partenheimer
RCC2	1/19/2006 0:00	8.5	5.2	9.6	7.5	1.5	51	185.3	0.1	0	Walt and Marion Partenheimer
RCC2	2/10/2006 0:00	5	3.5	10.7	7.5	2	54	226	0.04	0	Walt and Marion Partenheimer
RCC2	10/4/2006 0:00	20.5	17.1	7.3	7.75	3	58	220	0.1	0	CHARLOTTE GREENEWALT
RCC2	11/9/2006 0:00	17	13	8.9	7.25	1	52	170	0.04	0	CHARLOTTE GREENEWALT
RCC2	7/4/2007 0:00	29.5	18.5	8.5	7.75	0.25	56	220	0.1	0	Charlotte Greenewalt
	Min	-2.0	0.0	7.6	7.00	0.00	24	0	0.00		
	Max	31.0	24.0	13.2	8.00	3.00	82	260	0.30		
	Ave	16.7	12.0		7.51	1.44	55	197	0.08		
	Median	17.5	11.5		7.50	2.00	56	220	0.10		
	# of samples	37	37		37	37	37	37	37		
	Std	9.68	7.17		0.3033	0.9265	11.16	65.45	0.0694		
		DO ave. June - Sept		16.0							
		DO Median June- Sept		9.0							
		# of samples		11							
		DO Std		23.41							

#3 Mainstem at Yorklyn, north side of Benge Rd. Monthly chemical sampling											
via pail lowered over north side of bridge.											
Long 75 40'52"W Lat 39 48'24"N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
RCC3	9/7/2002 0:00	24	19	7.9	7.75	2	106	473	0	0	Michelle Alexander & Crawford MaKeand
RCC3	10/6/2002 0:00	19	19	9	8	1	104	491	1.8	0.3	Mike Lee & Michele Alexander
RCC3	11/10/2002 0:00	14	9	10.4	7.5	0	104	385	0	0	Mike Lee & Michele Alexander
RCC3	12/7/2002 0:00	5	1	12.1	7.5	5	94	584	0.44	0	Mike Lee & Michele Alexander
RCC3	1/4/2003 0:00	3.1	3.4	11.5	7.5	3	68	388	0.08	0	Mike Lee & Michele Alexander
RCC3	5/3/2003 0:00	17	15	11	8	4	82	432	0.38	0	Mike Lee & Michele Alexander
RCC3	6/8/2003 0:00	17.2	15.6	8.9	7.5	3	70	299	0.32	0	Mike Lee & Michele Alexander
RCC3	7/5/2003 0:00	28	22.3	9.1	7.5	5	77	393	0.38	0	Mike Lee & Michele Alexander
RCC3	8/2/2003 0:00	27.6	22.3	8.5	7.5	6	78	400	0.52	0	Mike Lee & Michele Alexander
RCC3	9/6/2003 0:00	22.5	18.5	9.2	7.5	4	86	498	0.68	0	Mike Lee & Michele Alexander
RCC3	10/5/2003 0:00	16	12.5	11.5	7.75	3	79	410	0.14	1.8	Mike Lee & Michele Alexander
RCC3	11/2/2003 0:00	22	15	10.4	7.5	2	73	394	0.29	0	Mike Lee & Michele Alexander
RCC3	12/7/2003 0:00	1	2	14.3	7.5	2	76	577	0.06	0	Mike Lee and Michele Alexander
RCC3	1/3/2004 0:00	9	7	12.4	7.5	1.5	68	372	0.1	0	Mike Lee & Michele Alexander
RCC3	2/1/2004 0:00	0	0	0	0	0	0	0	0	0	Mike Lee & Michele Alexander
RCC3	3/14/2004 0:00	8.5	5.5	15.8	8	4.5	71	408	0.18	1.3	Mike Lee & Michele Alexander
RCC3	4/10/2004 0:00	15	10	12.5	8	3	78	417	0.24	0	Mike Lee & Michele Alexander
RCC3	5/1/2004 0:00	24	16	10.1	8	5	80	369	0.29	0	Mike Lee & Michele Alexander
RCC3	6/12/2004 0:00	17	16	8.7	7.75	4.5	81	378	0.44	0	Mike Lee & Michele Alexander
RCC3	7/10/2004 0:00	32	23	9.7	8	6	84	372	0.41	0	Mike Lee & Michele Alexander
RCC3	8/7/2004 0:00	22	18.5	9.9	8	1.5	80	367	0.38	0	Mike Lee and Michele Alexander
RCC3	9/4/2004 0:00	26	21	10.5	8	1.5	82	411	0.29	0	Mike Lee and Michele Alexander
RCC3	10/10/2004 0:00	23	15.5	10.3	7.75	0.5	83	407	0.18	0	Mike Lee and Michele Alexander
RCC3	11/7/2004 0:00	20.5	18	10.8	7.75	0.5	80	384	0.36	0	Mike Lee and Michele Alexander
RCC3	12/4/2004 0:00	0	55	11.8	7.75	0.5	74	0	0.14	0	Mike Lee and Michele Alexander
RCC3	1/9/2005 0:00	4	7	12.6	8	3.25	69	0	0.02	0	Mike Lee and Michele Alexander
RCC3	2/5/2005 0:00	5.5	4.5	13.6	7.5	4.75	70	450	0.1	0	Mike Lee and Michele Alexander
RCC3	3/5/2005 0:00	6.5	2.5	12.5	7.5	3	68	490	0.03	0	Mike Lee and Michele Alexander
RCC3	5/14/2005 0:00	24	15.3	6.2	7.75	5	72	390	0.3	0	Michele Alexander & Mike Lee
RCC3	6/4/2005 0:00	22	15.9	7.6	7.5	5	70	330	0.26	0	Michele Alexander & Mike Lee
RCC3	7/4/2005 0:00	30	22	8	7.75	5	76	410	0.53	0	Michele Alexander & Mike Lee
RCC3	8/6/2005 0:00	31	24.6	8.5	8	3.2	90	430	0.55	0	Michele Alexander & Mike Lee
RCC3	10/2/2005 0:00	22	15.1	8.1	7.75	2	92	440	0.22	0	Michele Alexander/Mike Lee
RCC3	2/4/2006 0:00	8	7	12	7.5	0.5	70	340	0.1	3	Michele Alexander and Mike Lee
RCC3	3/5/2006 0:00	6.5	3.4	11.7	8	6	75	390	0.06	0	Michele Alexander & Mike Lee
RCC3	4/8/2006 0:00	60	9.6	11	7.5	5	84	329.5	0.04	0	Michele Alexander & Mike Lee
RCC3	5/7/2006 0:00	21.5	17	11.2	8.5	7	94	390	0.3	0	Michele Alexander & Mike Lee
RCC3	6/4/2006 0:00	18.7	17.6	8.7	7	3	70	310	0.14	0	Michele Alexander and Mike Lee
RCC3	7/8/2006 0:00	21.6	20.2	8.6	7.5	5	92	380	0.18	0	Michele Alexander and Mike Lee
RCC3	8/13/2006 0:00	32	20	8.3	7.25	4	0	400	0.2	0	Michele Alexander and Mike Lee
RCC3	9/4/2006 0:00	23	18.6	8.7	7.75	5	84	360	0.16	0	Michele Alexander and Mike Lee
RCC3	10/7/2006 0:00	14.5	13.1	10	7.5	3	80	360	0.12	0	Michele Alexander and mike Lee
RCC3	11/5/2006 0:00	5.5	6.1	12.3	7.5	4	94	390	0.06	0	Michele Alexander and Mike Lee
RCC3	12/2/2006 0:00	6	9.8	11.8	7.5	2	82	400	0.06	0	Michele Alexander and Mike Lee
RCC3	1/6/2007 0:00	18.5	11.7	8.8	7.5	2	72	370	0.08	0	Michele Alexander and Mike Lee
	Min	0.0	0.0	7.6	0.00	0.00	0	0	0.00		
	Max	60.0	55.0	10.5	8.50	7.00	106	584	1.80		
	Ave	17.6	14.2		7.52	3.26	77	377	0.26		
	Median	18.7	15.3		7.50	3.00	79	390	0.18		
	# of samples	45	45		45	45	45	45	45		
	Std	11.24	9.16		1.1767	1.8301	19.49	116.88	0.2893		
		DO ave. June - Sept		8.8							
		DO Median June- Sept		8.7							
		# of samples		16							
		DO Std		0.76							

#4 Mainstem at Ashland. Use site of workshop sampling. Follow stairs by garage down to creek floodplain, turn left proceeding to marker #1 at creek side. Park in Nature Center parking area.

Long 75 39'29"W Lat 39 47'54"N

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
RCC4	9/7/2002 0:00	22	19.5	7.8	7.5	2	104	527	0	0	Michelle Alexander & Crawford MaKeand
RCC4	10/6/2002 0:00	20	19	7	7.75	1	104	486	2.2	0	Michele Alexander and Mike Lee
RCC4	11/10/2002 0:00	12	9	0	0	0	0	0	0	0	Mike Lee and Michele Alexander
RCC4	12/7/2002 0:00	7.5	2	14.45	7	5.75	94	468	0.58	0	Mike Lee and Michele Alexander
RCC4	1/4/2003 0:00	2.5	4	11.8	7.5	3	70	257	0.04	0	Michele Alexander & Aaron Alexander
RCC4	4/13/2003 0:00	13.6	11.9	11.4	7.75	4	71	345	0.08	0	Mike Lee & Michele Alexander
RCC4	5/3/2003 0:00	13.6	15	9.3	8	4	74	420	0.32	0	Mike Lee & Michele Alexander
RCC4	6/8/2003 0:00	20	15.9	9.2	7.5	3	66	267	0.33	0	Mike Lee & Michele Alexander
RCC4	7/15/2003 0:00	24.5	21.7	8.2	7.5	5	78	378	0.35	0	Mike Lee & Michele Alexander
RCC4	8/2/2003 0:00	25.1	22.9	8.1	7.25	5	76	366	0.44	0	Mike Lee & Michele Alexander
RCC4	9/6/2003 0:00	18	18.5	8.6	8	2	86	479	0.42	0	Mike Lee & Michele Alexander
RCC4	10/5/2003 0:00	14.5	10.5	10.4	7.75	2	78	410	0.22	0	Mike Lee & Michele Alexander
RCC4	11/2/2003 0:00	20	14.5	9.9	7.5	2	76	384	0.19	0	Mike Lee & Michele Alexander
RCC4	12/7/2003 0:00	1	2	12.2	7.5	2	72	600	0.06	0	Mike Lee & Michele Alexander
RCC4	1/3/2004 0:00	10	7	11.8	7.75	1	72	397	0.07	0	Mike Lee & Michele Alexander
RCC4	2/1/2004 0:00	-3	1	14.9	7.75	1	70	309	0.07	0.2	Mike Lee & Michele Alexander
RCC4	3/14/2004 0:00	5.5	5.5	12.9	7.5	3	76	402	0.13	0	Mike Lee & Michele Alexander
RCC4	4/10/2004 0:00	15.5	11	10.4	8	4	76	402	0.18	0	Mike Lee & Michele Alexander
RCC4	5/1/2004 0:00	22	16	9.1	8	4	80	342	0.33	0	Mike Lee & Michele Alexander
RCC4	6/12/2004 0:00	18	16.5	8.7	7.75	3.75	80	407	0.49	0	Mike Lee & Michele Alexander
RCC4	7/10/2004 0:00	23	20	8.5	8	3	82	368	0.31	0	Mike Lee and Michele Alexander
RCC4	8/7/2004 0:00	0	0	9.2	8	1.5	80	359	0.5	17	Mike Lee and Michele Alexander
RCC4	9/4/2004 0:00	24	19	8.9	8	1.5	8.9	409	0.41	0	Mike Lee and Michele Alexander
RCC4	10/10/2004 0:00	19	15	9.4	7.75	0.5	82	357	0.3	0	Mike Lee and Michele Alexander
RCC4	11/7/2004 0:00	20	10	10.7	7.75	0.5	80	347	0.35	0	Mike Lee and Michele Alexander
RCC4	12/4/2004 0:00	10	5	11.8	7.75	0.5	80	378	0.18	0	Mike Lee and Michele Alexander
RCC4	1/9/2005 0:00	5	7	12.3	7.75	3	68	0	0.03	0	Mike Lee and Michele Alexander
RCC4	2/5/2005 0:00	6.5	4.5	12.4	7.5	3.75	68	400	3.75	0	Mike Lee and Michele Alexander
RCC4	3/5/2005 0:00	2.5	3.1	13.1	7.5	3	64	470	0.05	0	Mike Lee and Michele Alexander
RCC4	5/14/2005 0:00	25	14.9	8.6	7.5	3	78	380	0.23	0	Michele Alexander & Mike Lee
RCC4	6/4/2005 0:00	19	15.9	9.4	7.25	5	68	320	0.36	0	Michele Alexander & Mike Lee
RCC4	7/4/2005 0:00	23.5	21.1	8.8	7.5	6	86	390	0.52	0	Michele Alexander & Mike Lee
RCC4	8/6/2005 0:00	24	24.9	7.7	7.75	3	87	410	0.65	0	Michele Alexander & Mike Lee
RCC4	10/2/2005 0:00	18	14.7	9.4	7.75	2	88	430	0.48	0	Michele Alexander/Mike Lee
RCC4	2/4/2006 0:00	9.5	8	11.1	7.5	0.5	74	310	0.06	0	Michele Alexander & Mike Lee
RCC4	3/5/2006 0:00	5.5	3.7	10.8	7.5	6	76	380	0.04	0	Michele Alexander & Mike Lee
RCC4	4/8/2006 0:00	10	9.9	10.9	7.5	5	76	310	0.08	0	Michele Alexander & Mike Lee
RCC4	5/7/2006 0:00	18.5	17.4	9.5	8	5	82	380	0.08	0	Michele Alexander & Mike Lee
RCC4	6/4/2006 0:00	17.7	17.5	7	7.25	3	66	310	0.24	0	Michele Alexander and Mike Lee
RCC4	7/8/2006 0:00	24	20.1	8.3	7.5	3	90	0	0.14	0	Michele Alexander and Mike Lee
RCC4	8/13/2006 0:00	20.7	20.1	9.1	7.25	3	90	410	0.2	0	Michele Alexander and Mike Lee
RCC4	9/4/2006 0:00	20	18.6	8.7	7.75	3	78	340	0.14	0	Michele Alexander and Mike Lee
RCC4	10/7/2006 0:00	14.5	14	10	7.5	3	84	330	0.1	0	Michele Alezander and Mike Lee
RCC4	11/5/2006 0:00	5.5	6.1	10.6	7.5	3	86	360	0.06	0	Michele Alexander and Mike Lee
RCC4	12/2/2006 0:00	6.5	10.8	12.3	7.5	2	70	380	0.16	0	Michele Alexander and mike Lee
RCC4	1/6/2007 0:00	18	11.7	9.7	7.5	2	72	370	0.12	0	Michele Alexander and Mike Lee
	Min	-3.0	0.0	7.0	0.00	0.00	0	0	0.00		
	Max	25.1	24.9	10.9	8.00	6.00	104	600	3.75		
	Ave	14.6	12.5		7.46	2.88	75	360	0.35		
	Median	17.9	14.3		7.50	3.00	77	379	0.20		
	# of samples	46	46		46	46	46	46	46		
	Std	7.83	6.67		1.1498	1.5526	17.70	114.71	0.6134		
		DO ave. June - Sept		8.5							
		DO Median June- Sept		8.7							
		# of samples		16							
		DO Std		0.64							

#3 Old Possum Park Rd. (Middle Run)											
Long 75 43'13"W Lat 39 41'22"N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
WCC3	9/29/2002 0:00	32	19	8.7	7	0.5	52	159.3	0	0	Alison Long, Tammy Motahar
WCC3	10/27/2002 0:00	14	13	10.2	7.5	1	52	172.7	0.16	0	Alison Long, Tammy Motahar
WCC3	11/24/2002 0:00	14	8.5	10.7	7	2	40.8	174.7	0.08	0	Alison Long and Tammy Motahar
WCC3	12/29/2002 0:00	11.5	6	12	7	2	43	187.6	0.1	0	Alison Long and Tammy Motahar
WCC3	1/19/2003 0:00	8	3	13.9	6.5	2	38	189	0.04	0	Tammy Motahar and Alison Long
WCC3	2/15/2003 0:00	-4	-1	14.2	7	2	60	196.3	0	0	Alison Long and Tammy Motahar
WCC3	3/23/2003 0:00	20	12.5	10	7	1.5	22	157	0.04	0	Alison Long and Tammy Motahar
WCC3	4/19/2003 0:00	24	17	10	7	1.5	20.3	167.8	0.2	0	Alison Long and Tammy Motahar
WCC3	5/17/2003 0:00	14	12.5	11.25	7.5	1.5	24	177.2	0.04	0	Alison Long and Tammy Motahar
WCC3	6/15/2003 0:00	28	21	9.05	7	1.5	29	168.5	0.1	0	Alison Long and Tammy Motahar
WCC3	7/19/2003 0:00	31.5	24	8.4	7	3	28	182.3	0	0	Alison Long and Tammy Motahar
WCC3	8/4/2003 0:00	28	23	7.9	7.5	2	37	166	0	0	Alison Long and Tammy Motahar
WCC3	9/20/2003 0:00	33	24	7.7	7	1	28	0	0.17	0	Alison Long and Tammy Motahar
WCC3	11/18/2003 0:00	10.5	9.5	9.6	6.75	1	32	193	0.08	0	Jim Butz and Gloria Cooke
WCC3	11/22/2003 0:00	0	0	10	7	0	20	0	0.06	0	Melanie Arnold and Tammy Motahar
WCC3	12/28/2003 0:00	6	4.5	12.7	7	2	20	170	0.07	0	Melanie Arnold and Tammy Motahar
WCC3	3/7/2004 0:00	17	11	11.2	7	1	24	190	0.06	0	Tammy Motohar and Melanie Arnold
WCC3	4/10/2004 0:00	18	15	10.75	7.5	2	24	180	0.05	0	Tammy Motohar and Melanie Arnold
WCC3	5/9/2004 0:00	40	21	9.9	7.35	1.5	24	170	0.04	0	Tammy Motahar and Melanie Arnold
WCC3	6/27/2004 0:00	21	18	9.1	7.5	0.5	24	150	0.06	0	Tammy Motahar and Melanie Arnold
WCC3	7/11/2004 0:00	26	21	8.9	7.5	0.5	24	160	0.04	0	Tammy Motahar and Melanie Arnold
WCC3	8/22/2004 0:00	26	19	8.9	6.5	0	28	160	0.04	0	Melanie Arnold
WCC3	9/26/2004 0:00	19	17.5	9.3	2.5	0.375	30	170	0.05	0	Melanie Arnold
WCC3	11/6/2004 0:00	14	11	10	7	1	28	180	0.04	0	Melanie Arnold
WCC3	12/4/2004 0:00	9	6	12	7	2	23	180	0.06	0	Melanie Arnold and Tammy Motahar
WCC3	1/8/2005 0:00	4	5	0	6.5	1	24	170	0.02	0	Melanie Arnold and Tammy Motahar
WCC3	2/6/2005 0:00	8	5.5	12.9	7	2	24	240	0.04	0	Melanie Arnold and Tammy Motahar
WCC3	3/31/2005 0:00	10	10.1	9.5	6.5	1	20	160	0.06	0	Tammy Motahar
WCC3	4/10/2005 0:00	26	11	9.25	7	1	20	140	0	0	Tammy Motahar and Melanie Arnold
WCC3	5/15/2005 0:00	23.5	16.5	9	7	1	28	160	0	0	Tammy Motahar and Melanie Arnold
WCC3	6/5/2005 0:00	25	17	9.1	7	1	30	170	0.02	0	Tammy Motahar & Melanie Arnold
WCC3	7/10/2005 0:00	23.5	20	8.5	7.5	0.5	28	170	0	0	Tammy Motahar & Melanie Arnold
WCC3	9/18/2005 0:00	24	20.5	8.4	7	0	28	170	0.05	0	Tammy Motahar & Melanie Arnold
WCC3	10/23/2005 0:00	8.5	11	0	7	1	32	170	0.04	0	Tammy Motahar & Melanie Arnold
WCC3	11/20/2005 0:00	10	4.5	9.3	7	1	26	180	0.02	0	Tammy Motahar and Melanie Arnold
WCC3	12/11/2005 0:00	-1.5	0	10.8	7	1	28	220	0.02	0	Melanie Arnold
WCC3	1/8/2006 0:00	4.5	3	9.7	7	2	24	180	0	0	Tammy Motahar and Melanie Arnold
WCC3	2/19/2006 0:00	-5	0	9.7	7	2	20	220	0	0	Tammy Motahar and Melanie Arnold
WCC3	3/12/2006 0:00	11	10	10	7	2	28	180	0	0	Tammy Motahar & Melanie Arnold
WCC3	5/14/2006 0:00	16.5	14	10.2	7.5	2	24	220	0	0	Tammy Motahar & Melanie Arnold
WCC3	6/11/2006 0:00	15.5	14.5	9.7	7.5	1	28	170	1.5	0	Tammy Motahar & Melanie Arnold
WCC3	7/16/2006 0:00	27.5	21	9.6	7	1	24	170	0.04	0	Tammy Motahar and Melanie Arnold
WCC3	8/9/2006 0:00	29	23.5	13.1	7.5	1	28	160	0.06	0	Tammy Motahar and Melanie Arnold
WCC3	9/4/2006 0:00	20.5	19	8	7.5	0.5	28	180	0.06	0	Tammy Motahar and Melanie Arnold
WCC3	10/22/2006 0:00	7.5	9	11.3	7	0.25	32	180	0	0	Tammy Motahar and Melanie Arnold
WCC3	11/10/2006 0:00	19	12	6.8	7	0.5	49	124	0.11	0	Meg McHugh and Frank Dazle
WCC3	11/26/2006 0:00	7	5.5	9.5	7	1	20	170	0.1	0	Tammy Motahar and Melanie Arnold
WCC3	12/18/2006 0:00	10	5	11.5	7.5	2	24	170	0.02	0	Tammy Motahar and Melanie Arnold
WCC3	1/7/2007 0:00	12	8	11.8	6	2	24	160	0.12	0	Tammy Motahar and Melanie Arnold
WCC3	6/17/2007 0:00	27	19	9.4	7.5	2	28	190	0.1	0	Tammy Motahar & Melanie Arnold
	Min	-5.0	-1.0	7.7	2.50	0.00	20	0	0.00		
	Max	40.0	24.0	13.1	7.50	3.00	60	240	1.50		
	Ave	16.5	12.4		6.98	1.26	29	169	0.08		
	Median	16.0	12.3		7.00	1.00	28	170	0.04		
	#ofSamples	50	50		50	50	50	50	50		
	Std	10.25	7.19		0.7238	0.6889	8.95	39.93	0.2102		
		DO ave. June - Sept		9.0							
		Median		8.9							
		#of Samples		17							
		DO std. June - Sept		1.20							

#4 Old Capitol Trail (Mill Crk at)										
Long 75 39'57"W Lat 39 42'53"N										
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
WCC4	9/29/2002 0:00	30	18.5	8.4	7.5	1	48	215	0	0	Alison Long, Tammy Motahar
WCC4	10/27/2002 0:00	18	12.5	9.7	7.5	2	58	241	0.18	0	Alison Long, Tammy Motahar
WCC4	11/24/2002 0:00	15	7	11.6	7.5	2	60	262	0.16	0	Alison Long, Tammy Motahar
WCC4	12/29/2002 0:00	8	4	13	7.5	2	50	369	0	0	Alison Long and Tammy Motahar
WCC4	1/19/2003 0:00	0	0	13.95	7	2	62	429	0.02	0	Alison Long and Tammy Motahar
WCC4	2/15/2003 0:00	-4	0.3	14.1	7.5	0	60	1728	0	0	Alison Long and Tammy Motahar
WCC4	3/23/2003 0:00	22	13	11	7.5	2	32	280	0	0	Alison Long and Tammy Motahar
WCC4	4/19/2003 0:00	0	0	10	7.25	2	28	300	0	0	Alison Long and Tammy Motahar
WCC4	5/17/2003 0:00	12	12	10	7.5	2	40	288	0	0	Alison Long and Tammy Motahar
WCC4	6/15/2003 0:00	31	23	7.9	7.5	2	42	249	0	0	Alison Long and Tammy Motahar
WCC4	7/10/2003 0:00	34.5	24	8.2	7.5	3	42	263	0	0	Alison Long and Tammy Motahar
WCC4	8/4/2003 0:00	25	24	7	7.5	2	39	238	0	0	Alison Long and Tammy Motahar
WCC4	9/20/2003 0:00	30	22	7.6	7.5	2	60	0	0.31	0	Gloria Cooke and Tammy Motahar
WCC4	10/26/2003 0:00	22	14.5	10.8	7.5	4	44	233	0.06	0	Melanie Arnold and Tammy Motahar
WCC4	11/22/2003 0:00	14	11	10.5	7.5	0	40	0	0.07	0	Tammy Motahar and Melanie Arnold
WCC4	12/28/2003 0:00	11	4	13.3	7	3	39.5	280	0.07	0	Tammy Motahar and Melanie Arnold
WCC4	2/7/2004 0:00	4	3	12.05	6.5	1	12	150	0	0	Tammy Motohar and Melanie Arnold
WCC4	2/7/2004 0:00	4	3	12.2	7	1	20	310	0.1	0	Tammy Motahar and Melanie Arnold
WCC4	3/7/2004 0:00	15	11	10.7	7.5	1	36	370	0.05	0	Tammy Motahar and Melanie Arnold
WCC4	4/10/2004 0:00	18	14	11.7	8.5	2	38	310	0.04	0	Tammy Motahar and Melanie Arnold
WCC4	5/9/2004 0:00	35	19	9.2	7.5	2.5	40	280	0.06	0	Tammy Motahar and Melanie Arnold
WCC4	6/27/2004 0:00	27	21	9.3	7.5	2	44	270	0.04	0	Tammy Motahar and Melanie Arnold
WCC4	7/11/2004 0:00	30	24	8.35	7.5	1	44	290	0.09	0	Tammy Motahar and Melanie Arnold
WCC4	8/22/2004 0:00	25	20	8.7	7.5	0.25	38	270	0.1	0	Melanie Arnold
WCC4	9/25/2004 0:00	22	19	8.6	7.5	0.25	46	280	0.06	0	Melanie Arnold
WCC4	11/6/2004 0:00	12.5	10	10.3	7.5	1	52	300	0.06	0	Melanie Arnold
WCC4	12/4/2004 0:00	4	5	12	7	1.5	28	230	0.02	0	Melanie Arnold and Tammy Motahar
WCC4	1/8/2005 0:00	5	6	0	7	1	32	280	0.03	0	Melanie Arnold and Tammy Motahar
WCC4	2/6/2005 0:00	8.5	4	14.3	7.5	2.5	42	490	0.02	0	Melanie Arnold and Tammy Motahar
WCC4	3/31/2005 0:00	12.5	10.2	0	7.5	1.5	40	280	0.14	0	Tammy Motahar
WCC4	4/10/2005 0:00	24	14	9.4	7.5	1	40	270	0.05	0	Tammy Motahar and Melanie Arnold
WCC4	5/15/2005 0:00	23	18.5	8.7	7.5	2.5	52	280	0.01	0	Tammy Motahar and Melanie Arnold
WCC4	6/5/2005 0:00	28	21	7.2	6.5	2	30	290	0.06	0	Tammy Motahar & Melanie Arnold
WCC4	7/10/2005 0:00	29	22	8.3	7.25	1	46	270	0	0	Tammy Motahar & Melanie Arnold
WCC4	9/18/2005 0:00	25	23	0	7.5	0	40	230	0.06	0	Tammy Motahar & Melanie Arnold
WCC4	10/23/2005 0:00	12	12	0	7.5	1	40	230	0.04	0	Tammy Motahar & Melanie Arnold
WCC4	11/20/2005 0:00	8	5	10.5	7.5	2	46	290	0.02	0	Tammy Motahar and Melanie Arnold
WCC4	12/11/2005 0:00	1	2.5	10.9	6	2	40	380	0.02	0	Tammy Motahar and Melanie Arnold
WCC4	1/8/2006 0:00	6	4	10.1	7.5	2	38	300	0.04	0	Tammy Motahar and Melanie Arnold
WCC4	2/19/2006 0:00	-5	0	14.5	7.5	2	40	390	0.04	0	Tammy Motahar and Melanie Arnold
WCC4	3/12/2006 0:00	10	10.5	10.8	7	3	40	350	0	0.6	Tammy Motahar and Melanie Arnold
WCC4	5/14/2006 0:00	16	15	10.2	7.5	2	44	270	0.06	0	Tammy Motahar and Melanie Arnold
WCC4	6/11/2006 0:00	18	17	10.2	7.5	1.5	48	270	0.02	0	Tammy Motahar and Melanie Arnold
WCC4	7/16/2006 0:00	28	26.5	8.9	7.5	2	48	290	0.02	0	Tammy Motahar and Melanie Arnold
WCC4	8/9/2006 0:00	28	23	12.8	7.5	1	48	280	0.04	0	Tammy Motahar and Melanie Arnold
WCC4	9/4/2006 0:00	22.5	22	7.5	7.5	0.5	44	260	0.08	0	Tammy Motahar and Melanie Arnold
WCC4	10/22/2006 0:00	12.5	10.5	10.8	7	0.25	46	280	0.02	0	Tammy Motahar and Melanie Arnold
WCC4	11/26/2006 0:00	9.5	8	10.5	7.25	2	40	290	0.25	0	Tammy Motahar and Melanie Arnold
WCC4	12/18/2006 0:00	9	6	11.2	8	2	40	280	0.06	0	Tammy Motahar and Melanie Arnold
WCC4	1/7/2007 0:00	8.5	9	11.7	7.5	2	40	270	0.06	0	Tammy Motahar and Melanie Arnold
WCC4	6/17/2007 0:00	27	22	8.2	7.5	3	42	290	0.2	0	Tammy Motahar & Melanie Arnold
	Min	-5.0	0.0	0.0	6.00	0.00	12	0	0.00		
	Max	35.0	26.5	12.8	8.50	4.00	62	1728	0.31		
	Ave	16.3	12.8		7.38	1.65	42	305	0.06		
	Median	15.0	12.0		7.50	2.00	40	280	0.04		
	#ofSamples	51	51		51	51	51	51	51		
	Std	10.56	7.93		0.3653	0.8690	9.37	217.80	0.0655		
		DO ave. June - Sept		8.6							
		Median		8.4							
		#of Samples		21							
		DO std. June - Sept		2.52							

#5 Mainstem below Wooddale on north side of Rt. 48, Lancaster Pike; access creek from parking area on south side of bridge by following path closest to road side, then walking along creek bank under the bridge to the north side of the bridge at guaging station.Toss out pail to center of stream from bank right at guage marker for monthly chemical survey.

Long 75 38'12"W Lat 39 45'46"N

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
RCC5	10/31/2002 0:00	8	8	10.6	7.5	1	86	300	0.47	0	Gloria Cooke
RCC5	11/29/2002 0:00	3	3	12.4	7.5	2	80	340	0.58	0	Gloria Cooke
RCC5	12/30/2002 0:00	4	3.5	12.4	7.5	2	76	320	0.24	0	Gloria Cooke
RCC5	1/28/2003 0:00	-4	0.5	0	7	3	78	320	0.32	0	Gloria Cooke
RCC5	2/26/2003 0:00	-2.5	1.5	12.6	7	4	42	290	0.4	0	Gloria Cooke
RCC5	3/23/2003 0:00	11.5	11.5	10.5	7.5	4	50	290	0.75	0	Gloria Cooke
RCC5	5/2/2003 0:00	24.5	18.5	11.7	8	3	68	310	0.18	0	Gloria Cooke
RCC5	5/30/2003 0:00	23	8	9.6	7.5	3	57	290	0.34	0	Gloria Cooke
RCC5	6/27/2003 0:00	28	22.5	8.45	7	2	42	280	0.35	0	Gloria Cooke
RCC5	7/30/2003 0:00	22	23	9.4	7.5	0	60	330	0.5	0	Gloria Cooke
RCC5	8/30/2003 0:00	25	23	9.3	8	4	76	330	0.4	0	Gloria Cooke
RCC5	2/28/2004 0:00	12.5	5.5	12.8	7.5	3	55	300	0.11	0	Gloria Cooke and Dena Kirk
RCC5	4/29/2004 0:00	20	13	10.7	7.5	3	62	330	0.17	0	Gloria Cooke
RCC5	6/4/2004 0:00	22	18	9.8	7.5	3	66	340	0.26	0	Gloria Cooke
RCC5	7/30/2004 0:00	25	22	8	7.5	2	56	320	0	0	Gloria Cooke
RCC5	8/31/2004 0:00	25.5	20	0	7.5	3	56	210	0.39	0	Gloria Cooke
RCC5	10/2/2004 0:00	15	15	9.1	7.5	3	48	320	0.29	0	Gloria Cooke
RCC5	10/30/2004 0:00	15.5	12	9.9	7.5	0	60	340	0	0	Gloria Cooke
RCC5	11/30/2004 0:00	7.5	8	11.6	7.5	3	56	260	0.07	0	Gloria Cooke
RCC5	12/31/2004 0:00	9	5.5	9.6	7.5	0	44	320	0.03	0	Gloria Cooke
RCC5	2/26/2005 0:00	1	1.6	0	7.5	3	56	440	0.15	0	Gloria Cooke
RCC5	4/29/2005 0:00	14.5	13	0	7.5	3	60	320	0	0	Gloria Cooke
RCC5	5/31/2005 0:00	20.5	17.5	8.45	7.5	3	66	340	0.15	0	Gloria Cooke
RCC5	6/25/2005 0:00	23	20.5	8.9	7.5	3	65.5	360	0	0	Gloria Cooke, Jennifer Wolf
RCC5	7/31/2005 0:00	24.5	23	7.9	7.5	3	74	370	0.33	0	Gloria Cooke
RCC5	8/29/2005 0:00	26.5	23	7.55	7.5	3	66	400	0.4	0	Gloria Cooke
RCC5	9/30/2005 0:00	17	16	9.2	7.5	1	80	400	1	0	Gloria Cooke
RCC5	11/8/2005 0:00	17	10.8	12.2	7.5	4	82	380	0.35	0	Gloria Cooke
RCC5	11/29/2005 0:00	17	10.1	12.7	7.5	4	64	380	0.24	0	Gloria Cooke
RCC5	1/12/2006 0:00	0	0	10.9	7.5	4	62	370	0.28	0	Gloria Cooke
RCC5	3/27/2006 0:00	13	9.6	9.2	8	4	64	350	0.11	0	Gloria Cooke
RCC5	5/2/2006 0:00	21	16.7	8.2	7.5	4	66	340	0.17	0.05	Gloria Cooke
RCC5	8/29/2006 0:00	23.5	22	8	7.5	3	74	380	0.44	0	Gloria Cooke
RCC5	9/28/2006 0:00	19	16.3	9.1	7	2	94	380	0.3	0	Gloria Cooke
RCC5	11/1/2006 0:00	16	13	7.3	7.5	3	64	350	0.2	0	Gloria cooke
RCC5	11/27/2006 0:00	14	8.7	9.1	7.5	4	64	340	0.08	0	Gloria Cooke
RCC5	12/29/2006 0:00	8.5	5.6	9.4	7.5	3	62	340	0.1	0	Gloria Cooke
	Min	-4.0	0.0	0.0	7.00	0.00	42	210	0.00		
	Max	28.0	23.0	9.8	8.00	4.00	94	440	1.00		
	Ave	15.4	12.7		7.49	2.76	64	335	0.27		
	Median	17.0	13.0		7.50	3.00	64	340	0.26		
	# of samples	37	37		37	37	37	37	37		
	Std	8.76	7.33		0.2201	1.1403	12.02	42.86	0.2134		
		DO ave. June - Sept		8.0							
		DO Median June- Sept		8.7							
		# of samples		12							
		DO Std		2.61							

#6 Mainstem in Stanton area: Toss out pail from bank about 20m upstream											
of Kiamensi Road bridge for monthly chemical sampling.											
Long 75 38'01"W Lat 39 43'80"N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
RCC6	9/22/2002 0:00	22	20.5	8.3	7.4	2	76	370	0.4	0	David Haldeman
RCC6	10/27/2002 0:00	9	10.5	10.5	7.3	4	69	320	0.06	0	David Haldeman
RCC6	4/17/2004 0:00	12.5	22	9.95	7.5	3.5	56	260	0	0	John Deema and Gloria Cooke
RCC6	8/10/2005 0:00	26.1	24.9	7.9	7.5	1.7	82	330	0.5	7.25	Tim & Holly Walsh
RCC6	6/17/2007 0:00	23	20	5.7	8	4	103	340	0.22	0	Mike & Valerie Caskey
	Min	9.0	10.5	5.7	7.30	1.70	56	260	0.00		
	Max	26.1	24.9	8.3	8.00	4.00	103	370	0.50		
	Ave	18.5	19.6		7.54	3.04	77	324	0.24		
	Median	22.0	20.5		7.50	3.50	76	330	0.22		
	# of samples	5	5		5	5	5	5	5		
	Std	7.36	5.42		0.2702	1.1104	17.37	40.37	0.2142		
		DO ave. June - Sept		7.3							
		DO Median June- Sept		7.9							
		# of samples		3							
		DO Std		1.40							

#7 Hyde Run at Faulkland Road bridge just off Rt. 41, right on Faulkland if heading towards Kirkwood Hwy. Sample from stream side (nearest Rt. 41) on north side of bridge. Park in Hyde Park development on right just past bridge. Park on side of Wordsworth Dr. just inside development.

Long 75 38'42"W Lat 39 44'43"N

Site	Observation Date	Air Temp oC	Water Temp oC	Dissolved Oxygen	pH SU	Nitrate Nitrogen	Alkalinity ppm	Conductivity ug	Phosphates mg/L	Depth Feet	Observer
RCC7	9/22/2002 0:00	22	20.5	7.2	7.4	2.5	68	310	0.14	0	David Haldeman
RCC7	10/27/2002 0:00	12	11	10.3	7.3	2.5	48	270	0	0	David Haldeman
RCC7	11/15/2003 0:00	14	11	9.4	7	3	50	271	0.04	0	John and Barbara Reader
RCC7	3/14/2004 0:00	6.5	6	13	8	0	42	275	0.02	0	John and Barbara Reader
RCC7	4/18/2004 0:00	29.5	18.3	8.85	7.5	3	56	294	0.08	0	John and Barbara Reader
RCC7	5/25/2004 0:00	29	21.5	7.6	7.5	0	50	267	0.11	0	John and Barbara Reader
RCC7	6/6/2004 0:00	27	20.5	8.2	8	0	50.5	269	0.14	0	John and Barbara Reader
RCC7	7/24/2004 0:00	24.2	21.7	9.7	8	0	46	287	0.14	0	John and Barbara Reader
RCC7	8/24/2004 0:00	27.5	20.8	8.7	8	0	50	251	0.14	0	John and Barbara Reader
RCC7	4/10/2005 0:00	24.5	16.4	8.9	7.5	1.25	43.5	287	0.08	0	John and Barbar Reader
RCC7	6/11/2005 0:00	28.1	27.9	6.7	7.5	1	56	231	0.14	0	John & Barbara Reader
RCC7	7/30/2005 0:00	27	23.3	8	7.5	0.75	0.75	238	0.115	0	John & Barbara Reader
RCC7	8/20/2005 0:00	29.1	23.1	7.5	7.5	0.75	74	208	0.26	0	John & Barbara Reader
RCC7	10/23/2005 0:00	5.5	13.8	7.8	7.25	0.25	56	214	0.08	0	John & Barbara Reader
RCC7	6/16/2007 0:00	25.5	20	6	7.5	4	69	330	0.1	0	Valerie & Mike Craskey
	Min	5.5	6.0	6.0	7.00	0.00	1	208	0.00		
	Max	29.5	27.9	9.7	8.00	4.00	74	330	0.26		
	Ave	22.1	18.4		7.56	1.27	51	267	0.11		
	Median	25.5	20.5		7.50	0.75	50	270	0.11		
	# of samples	15	15		15	15	15	15	15		
	Std	8.34	5.75		0.3050	1.3676	16.72	33.94	0.0625		
		DO ave. June - Sept		7.8							
		DO Median June- Sept		7.8							
		# of samples		8							
		DO Std		1.16							

#8 Outflow from Hoopes Reservoir just before it enters Red Clay Creek. Sample from bridge on downstream side (across Barley Mill Rd. from reservoir). Park in Reservoir driveway on weekends or nights. If a weekday, then park in grass along side of Reservoir driveway, so you do not block driveway.											
Long 75 38'12"W Lat 39 46'14"N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
RCC8	10/31/2002 0:00	5	12	9.6	7.5	0	66	210	0	0	Gloria Cooke
RCC8	11/29/2002 0:00	4.5	8	10.5	7	0.25	62	190	0	0	Gloria Cooke
RCC8	12/30/2002 0:00	6.5	5.5	11.3	7.5	0.25	58	170	0.08	0	Gloria Cooke
RCC8	1/28/2003 0:00	-2	2	14	7	0	78	160	0	0	Gloria Cooke
RCC8	2/26/2003 0:00	2.5	5	11.9	7	0.25	42	150	0.06	0	Gloria Cooke
RCC8	3/23/2003 0:00	15.5	7	11.65	7.5	0.25	52	180	0.5	0	Gloria Cooke
RCC8	5/2/2003 0:00	27	19	9.1	7	0.25	42	170	0.07	0	Gloria Cooke
RCC8	5/30/2003 0:00	25.5	20.5	8.7	7	0.25	42	180	0	0	Gloria Cooke
RCC8	6/27/2003 0:00	30	26	7.4	7.5	0.25	42	170	0.24	0	Gloria Cooke
RCC8	7/30/2003 0:00	25	26	7.9	7	0.25	40	240	0.02	0	Gloria Cooke
RCC8	9/2/2003 0:00	23.5	18	9.5	7	0	52	0	0	0	Gloria Cooke
RCC8	10/24/2003 0:00	13	14.5	10	7	0.25	40	170	0	0	Gloria Cooke
RCC8	11/23/2003 0:00	15	12	9.9	7	0	54	170	0	0	Gloria Cooke
RCC8	12/31/2003 0:00	10.5	9	11	7	0.25	44	140	0	0	Gloria Cooke
RCC8	1/17/2004 0:00	1.5	6	10.8	7	0	54	140	0	0	Gloria Cooke
RCC8	2/28/2004 0:00	11	7.5	12.1	7.5	0	54	150	0.02	0	Gloria Cooke and Dena Kirk
RCC8	4/26/2004 0:00	7.5	14.1	11.4	7.5	0.25	36	190	0.04	0	Gloria Cooke - Winnie O'Neill
RCC8	4/28/2004 0:00	13	15	9.5	7.5	0.25	42	220	0	0	Gloria Cooke
RCC8	6/4/2004 0:00	22	21.5	8.5	7.5	0.25	40	220	0.01	0	Gloria Cooke
RCC8	7/30/2004 0:00	30	22	9.4	7.5	0	52	240	0	0	Gloria Cooke
RCC8	8/31/2004 0:00	22.5	23	0	8	0	50	270	0.03	0	Gloria Cooke
RCC8	10/2/2004 0:00	15	17	9.1	7	0	42	190	0.08	0	Gloria Cooke
RCC8	10/30/2004 0:00	16	13	9.6	7.5	0	52	210	0	0	Gloria Cooke
RCC8	11/30/2004 0:00	12	11	8.1	7	0.25	56	190	0.03	0	Gloria Cooke
RCC8	12/31/2004 0:00	15.5	10.5	12	7	3	60	190	0.28	0	Gloria Cooke
RCC8	2/26/2005 0:00	1.5	4.3	0	7	0	44	190	0.05	0	Gloria Cooke
RCC8	4/29/2005 0:00	15	14.9	0	7	0	36	180	0.04	0	Gloria Cooke
RCC8	5/31/2005 0:00	26.5	21.5	6.7	7	0.25	38	200	0.01	0	Gloria Cooke
RCC8	6/25/2005 0:00	23	14	7.8	7	0.25	46	200	0.02	0	Gloria Cooke/Jennifer Wolf
RCC8	7/31/2005 0:00	26	18	8.2	7.25	0.25	46	200	0.05	0	Gloria Cooke
RCC8	8/29/2005 0:00	22.7	20.6	7.1	7.5	0.25	50	200	0	0	Gloria Cooke
RCC8	9/30/2005 0:00	14	13.7	9.2	7	0.25	58	210	0	0	Gloria Cooke
RCC8	11/8/2005 0:00	20	0	10.7	7	0.25	48	200	0.18	0	Gloria Cooke
RCC8	11/29/2005 0:00	19.5	13	10.4	7	0	42	200	0.03	0	Gloria Cooke
RCC8	1/12/2006 0:00	0	0	11.6	7	0.25	48	200	0.02	0	Gloria Cooke
RCC8	3/27/2006 0:00	17	13.1	8.6	7	0.25	40	190	0.15	0	Gloria Cooke
RCC8	8/29/2006 0:00	24	18	8.5	7.5	0.25	44	210	0.02	0	Gloria Cooke
RCC8	9/28/2006 0:00	16.5	18	6.7	7	0.25	50	200	0.04	0	Gloria Cooke and Barbara Dickmann
RCC8	11/1/2006 0:00	21.5	14.8	6.7	7.5	0.25	46	210	0.06	0	Gloria Cooke
RCC8	11/27/2006 0:00	13.5	11.3	8.1	7.5	0.25	52	200	0.02	0	Gloria Cooke
RCC8	12/29/2006 0:00	12	10	7.4	7	0.25	50	200	0.02	0	Gloria Cooke
	Min	-2.0	0.0	0.0	7.00	0.00	36	0	0.00		
	Max	30.0	26.0	9.5	8.00	3.00	78	270	0.50		
	Ave	15.6	13.4		7.20	0.24	49	188	0.05		
	Median	15.5	13.7		7.00	0.25	48	190	0.02		
	# of samples	41	41		41	41	41	41	41		
	Std	8.60	6.66		0.2694	0.4574	8.63	39.84	0.0957		
		DO ave. June - Sept		7.5							
		DO Median June- Sept		8.1							
		# of samples		12							
		DO Std		2.53							

#1 Village of Manley											
Long	75 41'48"W Lat 39 46'47"N										
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
WCC1	11/15/2003 0:00	12.5	8	10.95	7.5	6	62	333	0.14	0	John and Barbara Reader
WCC1	3/14/2004 0:00	7	6	12.9	8	0	62	322	0.08	0	John and Barbara Reader
WCC1	4/18/2004 0:00	30	23.3	9.3	8	6	72	254	0.08	0	John and Barbara Reader
WCC1	5/25/2004 0:00	29	21.5	5.3	7.75	0	81	367	0.44	0	John and Barbara Reader
WCC1	6/26/2004 0:00	27	20.4	6.6	8	0	81	362	0.43	0	John and Barbara Reader
WCC1	7/24/2004 0:00	25.5	20.6	7.05	8	0	77	375	0.18	0	John and Barbara Reader
WCC1	8/24/2004 0:00	27	20.5	5	7.5	0	86	387	0.81	0	John and Barbara Reader
WCC1	4/10/2005 0:00	21.5	17.8	9.3	8	4	71	344	0.11	0	John and Barbara Reader
WCC1	5/14/2005 0:00	25.1	18.8	8.8	7.5	5	74	375	0.63	0.81	John & Barbara Reader
WCC1	6/11/2005 0:00	28.9	22.3	7.4	7.25	3	75	334	0.4	0	John & Barbara Reader
WCC1	7/30/2005 0:00	28.3	23.3	5.6	7.5	3	74	336	0.52	0	John & Barbara Reader
WCC1	8/20/2005 0:00	28.4	23	7	7.5	0.5	58	280	0.13	0	John & Barbara Reader
WCC1	10/23/2005 0:00	15.5	12.6	8	7.5	0.25	75	358	0	0	John & Barbara Reader
	Min	7.0	6.0	5.0	7.25	0.00	58	254	0.00		
	Max	30.0	23.3	7.4	8.00	6.00	86	387	0.81		
	Ave	23.5	18.3		7.69	2.13	73	341	0.30		
	Median	27.0	20.5		7.50	0.50	74	344	0.18		
	#ofSamples	13	13		13	13	13	13	13		
	Std	7.21	5.78		0.2787	2.4905	8.48	39.66	0.2441		
		DO ave. June - Sept		6.4							
		Median		6.8							
		#of Samples		6							
		DO std. June - Sept		0.94							

#2 Independence School											
Long 75 43'02"W Lat 39 44'44"N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
WCC2	11/5/2003 0:00	21	16	9.3	7.5	4.5	42	230	0.1	0	Julie San Miguel and Veronica O'Kane
WCC2	12/4/2003 0:00	4.9	5.1	13.1	7.5	4	38	210	0.09	0	Veronica O'Kane, Gloria Cooke
WCC2	1/31/2004 0:00	-2.5	2.1	14.3	7.375	4	50	190	0.06	0	Julie San Miguel
WCC2	2/29/2004 0:00	19	8.5	10.7	7.5	4	32	210	0.155	0	Julie San Miguel
WCC2	3/28/2004 0:00	48.3	0	11.2	7.25	3	36	190	0.12	0	Julie San Miguel
WCC2	5/26/2004 0:00	21.5	18.5	8.3	7.25	3.5	36	230	0.135	0	Julie San Miguel
WCC2	6/28/2004 0:00	23.2	20	9.3	7.5	3	40	220	0.12	0	Julie San Miguel
WCC2	7/31/2004 0:00	31	20	9	7.5	3	42	220	0.13	0	Julie San Miguel
WCC2	8/31/2004 0:00	26	21	8.7	7.25	3	48	220	0.14	0	Julie San Miguel
WCC2	9/30/2004 0:00	18	13.5	9.7	7.25	3	52	250	0.14	0	Julie San Miguel
WCC2	10/25/2004 0:00	20.2	12.5	11.4	7.25	3	48	245	0.12	0	Julie San Miguel
WCC2	11/22/2004 0:00	11	11.5	12.6	7.75	3	43	240	0.12	0	Julie San Miguel
WCC2	12/28/2004 0:00	1.5	9.4	10.3	7.25	3.5	50	240	0.14	0	Julie San Miguel
WCC2	1/28/2005 0:00	-1	8.5	11.5	7.25	3	36	250	0.1	0	Julie San Miguel
WCC2	2/28/2005 0:00	1.2	8.4	10.3	7.25	3.5	43	230	0.12	0	Julie San Miguel
WCC2	3/30/2005 0:00	12.8	9	9.6	7.25	3	40	220	0.11	0	Julie San Miguel
WCC2	4/30/2005 0:00	12.4	10.2	8.3	7.25	3	44	240	0.12	0	Julie San Miguel
WCC2	5/21/2005 0:00	21.6	18.1	8.25	7.25	3	40	230	0.14	0	Julie San Miguel
WCC2	6/25/2005 0:00	30.2	21.2	8.4	7.25	3	40	235	0.15	0	Julie San Miguel
WCC2	7/31/2005 0:00	29.5	23.2	8.1	7.25	3	44	240	0.18	0	Julie San Miguel
WCC2	8/31/2005 0:00	23	20.5	8.6	7.75	3	44	250	0.15	0	Julie San Miguel
WCC2	9/27/2005 0:00	22.2	20.4	0	7.5	3	46	250	0.14	0	Julie San Miguel
WCC2	10/26/2005 0:00	11.6	12	8.95	7.25	3	44	260	0.12	0	Julie San Miquel
WCC2	11/22/2005 0:00	7.2	11	9.35	7.25	3	42	255	0.14	0	Julie San Miquel
WCC2	1/30/2006 0:00	10.2	8.4	9.7	7.25	3	42	250	0.12	0	Julie SanMiguel
WCC2	2/26/2006 0:00	-2.2	7.2	9.4	7.25	3	42	240	0.13	0	Julie SanMiguel
WCC2	3/26/2006 0:00	5.4	8.8	10	7.5	3	43	240	0.14	0	Julie San Miguel
WCC2	4/30/2006 0:00	18.5	12.2	9.6	7.25	3.5	44	260	0.12	0	Julie San Miguel
WCC2	6/29/2006 0:00	26.5	20.8	8.8	7.25	4	44	240	0.14	0	Julie san miguel
WCC2	7/27/2006 0:00	26.8	21.5	8.6	7.25	3	42	250	0.15	0	Julie San Miguel
WCC2	8/29/2006 0:00	25.8	21	8.5	7.25	3	46	240	0.16	0	Julie San Miguel
WCC2	9/21/2006 0:00	19.5	14.5	8.7	7.25	4	44	240	0.11	0	Julie San Miguel
WCC2	10/31/2006 0:00	18.5	14.6	8.8	7.25	4	43	250	0.1	0	Julie San Miguel
WCC2	11/24/2006 0:00	15	12.4	9.6	7.25	4	42	250	0.12	0	Julie San Miguel
WCC2	12/24/2006 0:00	6	11.4	9.7	7.25	4	36	260	0.13	0	Julie San Miguel
WCC2	1/28/2007 0:00	1.5	8.5	10.1	7.5	3	36	270	0.12	0	Julie San Miguel
	Min	-2.5	0.0	0.0	7.25	3.00	32	190	0.06		
	Max	48.3	23.2	9.7	7.75	4.50	52	270	0.18		
	Ave	16.3	13.4		7.34	3.32	42	237	0.13		
	Median	18.5	12.3		7.25	3.00	43	240	0.13		
	#ofSamples	36	36		36	36	36	36	36		
	Std	11.30	6.00		0.1458	0.4653	4.38	18.30	0.0220		
		DO ave. June - Sept		8.0							
		Median		8.7							
		#of Samples		12							
		DO std. June - Sept		2.56							

#5 Paper Mill Rd (Middle Run)											
Long 75 43'35"W Lat 39 44'06"N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
WCC5	9/2/2002 0:00	21.5	19.8	6.3	7	0.25	54	190	0	0	Jeanine McGann & Cameron Burwell
WCC5	11/3/2002 0:00	4.5	6	10.7	7	1	79	195	0.04	0	Cameron Burwell and Jeanine McGann
WCC5	10/2/2003 0:00	0	12.5	9.3	7	1	42	194	0.09	0	Jim Butz and Gloria Cooke
WCC5	12/16/2003 0:00	7	3	12.5	7	1.5	29	177	0.05	0	James Butz
WCC5	2/22/2005 0:00	8	4	11	7.25	1	34	154	0.13	0	Meg McHugh, Frank Doyle
WCC5	3/27/2005 0:00	10	9	11.1	7.25	0.5	28	159	0.08	0	Meg McHugh, Frank Doyle
WCC5	4/26/2005 0:00	22.2	11.5	8.3	7.5	0.5	22	146	0.06	0	Meg McHugh, Frank Doyle
WCC5	5/17/2005 0:00	20	16	8.2	7.25	0.25	40	180	0.16	0	Meg McHugh, Frank Doyle
WCC5	6/6/2005 0:00	32.5	25	6.4	7.25	0.25	35	173	0.18	0	Meg McHugh
WCC5	7/14/2005 0:00	28	27	5.2	7.25	0.25	42	200	0.32	0	Meg McHugh
WCC5	8/19/2005 0:00	26.5	25	5.7	7.25	0.25	37	200	0.3	0	Meg McHugh
WCC5	9/16/2005 0:00	31	25	5.8	7.25	0.5	32	134	0.25	0	Meg McHugh
WCC5	10/12/2005 0:00	18	17	7.6	7.25	1	30	152	0.06	0	Meg McHugh & Frank Doyle
WCC5	11/7/2005 0:00	18	13	8	7	0.5	31	160	0.16	0	Meg McHugh and Frank Doyle
WCC5	11/30/2005 0:00	17.5	11	9	7	0.5	26	130	0.07	0	Meg McHugh and Frank Doyle
WCC5	1/10/2006 0:00	9	5	12	7.25	1	38	142	0.15	0	Meg McHugh and Frank Doyle
WCC5	1/26/2006 0:00	5	3.5	11	6.5	1.5	20	300	0	0	John Jacobs and Gloria Cooke
WCC5	2/15/2006 0:00	10	4	10.4	7.25	1	30	145	0.2	0	Meg McHugh and Frank Doyle
WCC5	3/14/2006 0:00	17	14	8.5	7.25	1	38	185	0.14	0	Frank Doyle & Meg McHugh
WCC5	4/11/2006 0:00	21	11.5	9.4	7.25	0.5	38	161	0.13	0	Frank Doyle & Meg McHugh
WCC5	5/9/2006 0:00	21.5	16	8.1	7.25	0.25	46	177	0.04	0	Meg McHugh & Frank Doyle
WCC5	6/4/2006 0:00	22	18	7.7	7.25	0.25	42	152	0.1	0	Meg McHugh & Frank Doyle
WCC5	7/10/2006 0:00	28	25	5.3	7	0.25	40	154	0.31	0	Meg McHugh and Frank Doyle
WCC5	8/19/2006 0:00	26.5	24.5	3.7	7	0.25	36	169	0.4	0	Meg McHugh and Frank Doyle
WCC5	9/26/2006 0:00	21	17	5.3	6.75	0.25	40	157	0.1	0	Meg McHugh and Frank Doyle
WCC5	10/18/2006 0:00	21.5	15	7.3	7.25	0.5	42	132	0.04	0	Meg McHugh and frank doyle
WCC5	12/11/2006 0:00	13	5	9.6	7.25	1	38	152	0.31	0	Meg McHugh and Frank Doyle
WCC5	1/3/2007 0:00	10	4	20.5	7.5	1	34	114	0.17	0	Meg McHugh and Frank Doyle
WCC5	6/12/2007 0:00	27	24	5.5	7.25	0.25	34	177	0.2	0	Meg McHugh/Frank Doyle
	Min	0.0	3.0	3.7	6.50	0.25	20	114	0.00		
	Max	32.5	27.0	20.5	7.50	1.50	79	300	0.40		
	Ave	17.8	14.2		7.16	0.63	37	168	0.15		
	Median	20.0	14.0		7.25	0.50	37	160	0.13		
	#ofSamples	29	29		29	29	29	29	29		
	Std	8.64	7.90		0.2050	0.3988	10.75	33.82	0.1051		
		DO ave. June - Sept		7.3							
		Median		5.8							
		#of Samples		13							
		DO std. June - Sept		4.23							

#6 14 White Clay Drive											
Long 75 44'57"W Lat 39 41'23"N											
Site	**Observation Date**	**Air Temp oC**	**Water Temp oC**	**Dissolved Oxygen**	**pH SU**	**Nitrate Nitrogen**	**Alkalinity ppm**	**Conductivity ug**	**Phosphates mg/L**	**Depth Feet**	**Observer**
WCC6	9/2/2002 0:00	25	19.8	8.5	7.5	2	74	328	0.4	0	Jeanine McGann & Cameron Burwell
WCC6	11/3/2002 0:00	9.5	6.5	11.8	7.7	2	58	374	0.01	0	Cameron Burwell and Jeanine McGann
WCC6	10/2/2003 0:00	12	13	9.7	7.5	4	77	370	0.12	0	Jim Butz and Gloria Cooke
WCC6	11/18/2003 0:00	11.5	8	11.5	7.5	5	66	320	0.1	0	Jim Butz and Gloria Cooke
WCC6	12/16/2003 0:00	11	3.5	12.1	7.4	3	65	312	0.12	0	James Butz
WCC6	2/22/2005 0:00	8	4.5	11.9	7.5	3	51	353	0.05	0	Meg McHugh, Frank Doyle
WCC6	3/27/2005 0:00	11	8	10.2	7.75	3	50	274	0.07	0	Meg McHugh, Frank Doyle
WCC6	4/26/2005 0:00	21.5	11.5	9.1	7.75	3	50	249	0.04	0	Meg McHugh, Frank Doyle
WCC6	5/17/2005 0:00	18.5	15.5	9.6	7.75	3	56	272	0.1	0	Meg McHugh, Frank Doyle
WCC6	6/6/2005 0:00	29	21	6.9	7.5	3	54	285	0.27	0	Meg McHugh & Frank Doyle
WCC6	7/14/2005 0:00	26.5	24	8.2	7.75	3	62	322	0.29	0	Meg McHugh & Frank Doyle
WCC6	8/19/2005 0:00	23	22.5	7.5	7.75	1	66	300	0.29	0	Meg McHugh & Frank Doyle
WCC6	9/16/2005 0:00	29	23	5.8	7.5	2	56	233	0.6	0	Meg McHugh & Frank Doyle
WCC6	10/12/2005 0:00	16.5	16	9.7	7.5	0.5	70	316	0.34	0	Meg McHugh & Frank Doyle
WCC6	11/7/2005 0:00	17.5	12	9.6	7.5	3	66	300	0.2	0	Meg McHugh and Frank Doyle
WCC6	11/30/2005 0:00	16	12	9.6	7.25	3	50	242	0.49	0	Meg McHugh and Frank Doyle
WCC6	1/10/2006 0:00	11	5	9.3	7.5	4	62	255	0.12	0	Meg McHugh and Frank Doyle
WCC6	2/15/2006 0:00	9	3.5	9.9	7.5	4	58	280	0.09	0	Meg McHugh and Frank Doyle
WCC6	3/14/2006 0:00	12	14	9.6	7.75	4	60	176	0.04	0	Meg McHugh & Frank Doyle
WCC6	4/11/2006 0:00	21	11	11.8	8	3	62	270	0.04	0	Frank Doyle & Meg McHugh
WCC6	5/9/2006 0:00	22	15	8.8	7.75	4	68	276	0.1	0	Meg McHugh & Frank Doyle
WCC6	6/4/2006 0:00	21	18	8	7.25	2	50	258	0.2	0	Meg McHugh & Frank Doyle
WCC6	7/10/2006 0:00	26	21	8.2	7.5	1.5	68	315	0.22	0	Meg McHugh and Frank Doyle
WCC6	8/19/2006 0:00	26	23	7.3	7.75	1	78	338	0.32	0	Meg McHugh and Frank Doyle
WCC6	9/26/2006 0:00	22	16	9.6	8	4	74	327	0.3	0	Meg McHugh and Frank Doyle
WCC6	10/18/2006 0:00	20.5	14	8.3	7.5	4	66	256	0.39	0	Meg McHugh and Frank Doyle
WCC6	11/10/2006 0:00	18	12	9.2	7.25	4	64	248	0.2	0	Meg McHugh and Frank Doyle
WCC6	12/11/2006 0:00	13	4	10.1	7.75	4	64	251	0.14	0	Meg McHugh and Frank doyle
WCC6	1/3/2007 0:00	10	5	18.4	7.5	3	60	224	0.06	0	Meg Mchugh and Frank Doyle
WCC6	6/12/2007 0:00	27	21	7	7.5	4	50	242	0.4	0	Meg McHugh/Frank Doyle
	Min	8.0	3.5	5.8	7.25	0.50	50	176	0.01		
	Max	29.0	24.0	18.4	8.00	5.00	78	374	0.60		
	Ave	18.1	13.4		7.59	3.00	62	286	0.20		
	Median	18.3	13.5		7.50	3.00	62	278	0.17		
	#ofSamples	30	30		30	30	30	30	30		
	Std	6.63	6.60		0.1925	1.0907	8.31	45.76	0.1511		
		DO ave. June - Sept		8.8							
		Median		8.2							
		#of Samples		14							
		DO std. June - Sept		2.99							

Appendix B

Commenter: Center for Biological Diversity

Comment 1: *On December 13, 2007, the Center for Biological Diversity submitted scientific information supporting the inclusion of ocean waters on Delaware's 303(d) List. Since then, it has only become more apparent that ocean acidification poses serious threat to Delaware's water quality with adverse effects on marine life. However, Delaware's draft 303(d) listing decisions failed to include any ocean segments impaired by carbon dioxide pollution. Moreover, the draft assessment documents completely failed to discuss or mention ocean acidification, a serious water quality problem facing DNREC.*

The submission of December 13, 2007 had no Delaware specific data or information. No evidence was submitted showing that Delaware's applicable pH standards were not being attained. There is no Delaware specific evidence that ocean acidification is a serious water quality problem facing DNREC.

Comment 2: *In light of this significant oversight, the Center for Biological Diversity respectfully requests that DNREC:*

- ***Include all ocean water segments in Delaware's List of Impaired Waterbodies ("303(d) List") under section 303(d) of the Clean Water Act as impaired for pH due to absorption of anthropogenic carbon dioxide pollution; and***
- ***Include guidance for monitoring and reducing water quality impacts due to carbon dioxide pollution in the 2008 Integrated Report.***

See the response to comment 1 above.
Guidance for monitoring is not typically included in integrated reports; rather it may be included in Standards documents.

Comment 3: ***(1) Delaware's 303(d) List should have included ocean segments as impaired for pH due to ocean acidification***

See the response to comment 1.

Comment 4: *Pursuant to the Clean Water Act and Delaware's implementation of the Act, DNREC has the authority and duty to list ocean waters in the 303(d) List. Ocean waters do not attain Delaware's water quality standards because they are being degraded in violation of the antidegradation policy; and in the foreseeable future, they will not attain the pH standard. Moreover, there are not sufficient controls on carbon dioxide pollution to address the serious water quality problem of ocean acidification.*

See the response to comment 1.

Comment 5: ... *Here, the degradation of water quality violates the antidegradation policy. Absent a specific finding exempting certain waters, ocean waters violate the* *antidegradation standard. Moreover, Delaware's ocean waters are on a trajectory of non-attainment of the pH standard by the end of the century.*

See the response to comment 1. One document provided by the Commenter claims a change in pH since 1750. In addition, the Commenter appears to be making their claim based on projected water quality conditions 92 years from now. Both situations are outside the scope of the assessment methodology.

Comment 6: ***(2) New scientific research demonstrates the threats of ocean acidification***
As described and supported in the Center's previous letter, carbon dioxide pollution has already lowered average ocean pH by 0.11 units, with a pH change of 0.5 units projected by the end of the century under current emission trajectories.

See the response to comments 1 and 5.

Comment 7: ***(2) Delaware has a duty to consider information and data available related to ocean acidification***

See the response to comments 1 and 5.

Commenter: Todd A. Coomes
Affiliation: Richards Layton & Finger on behalf of Kent County Levy Court

(Editors Note: Mr. Coomes' comments on behalf of the County totaled 23 pages and included several hundred pages of supporting documents. They were summarized within the comment, by the commenter. The summary statements are repeated below.)

1. DNREC has not promulgated the Tentative 303(d) List, which constitutes a regulation, in accordance with Delaware law;

The 303(d) List is not a regulation.

As noted in the public notice of the availability of the Tentative List:

"Section 303(d) of the Federal Clean Water Act and implementing regulations (40 CFR 130.7) require each state to identify and prioritize water quality limited segments still requiring Waste Load Allocations/Load Allocations (WLAs/Las) and Total Maximum Daily Loads (TMDLs) within its boundaries. A water quality limited segment is a waterbody or portion of a waterbody (e.g., a length of river, an area of an estuary, a pond or wetland, etc.) in which water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after the application of technology-based effluent limitations required by sections 301(b) and 306 of the Clean Water Act. A TMDL specifies the maximum allowable loading of a pollutant or thermal energy to a waterbody and allocates that loading or thermal energy to contributing point and nonpoint sources such that water quality standards can be attained."

The commenter's comments note that "Section 303(d) of the CWA requires the periodic identification and listing by the State of waters for which effluent limitations on pollutant discharge required by section 1311(b)(1) of the CWA "are not stringent enough to implement any water quality standard applicable to such waters."

The list is used to delineate the waters for which TMDLs are required. The TMDLs are subject to applicable Delaware Laws and implementing regulations. In order to more fully inform the public of conditions existing in surface waters of the State, when a TMDL has been established, the waters are put into Category 4a until all applicable criteria are met. Then those waters are put into Category 1. The Department advertises the Tentative List and asks for comments as one way to ensure that stakeholders have a say in which waters are listed and have TMDLs developed to meet the Clean Water Act goals of restoring the physical, chemical and biological integrity of the waters.

2. The Clean Water Act does not contemplate the listing of a water segment such as the lower Murderkill River where water quality reflects natural conditions;

It has not been demonstrated that natural conditions are responsible for impaired water quality in the segments. If such a demonstration is made, future lists will reflect those findings.

3. The lower Murderkill River should not be listed for nutrients because DNREC *(a). has not demonstrated the failure of the segment to meet the narrative water quality standard*

(b). appears to be utilizing unapproved numerical standards in its determination of attainment,

(c). has not adequately described its methodology or the data and information used in its analysis, and

(d). utilizes "targets" and "guidelines" not appropriate for the lower Murderkill River;

Section 7 of the State Standards provides narrative criteria to minimize the impact of nutrient input to the surface waters from point and human-induced nonpoint sources. For the past several 303(d) lists, the Department has used average levels greater than 1.0 mg/l for total nitrogen and 0.1 mg/l for total phosphorous as indicators of nutrient impairment based on literature values and best professional judgment. The appropriateness of these nutrient levels was recently documented by a study conducted for DNREC and the U.S. Environmental Protection Agency (EPA) Region 3 by Kent S. Price, Ph.D. The study, "Data Analysis for the Development of Nutrient Criteria for Estuaries in Delaware, Kent S. Price, June 12, 2001," was carried out to assist the State in the establishment of nutrient criteria for estuaries and tidal rivers. By applying EPA's methodology for establishing nutrient criteria, the study concluded that for Delaware tidal rivers, the nutrient criteria should be approximately 1.73 mg/l for total nitrogen and 0.09 mg/l for total phosphorous. The lower confidence limits (LCL) for the 90th percentile of total nitrogen data was reported between 2.1 and 4.7 mg/l for the lower Murderkill stations. For phosphorous the 90th percentile LCLs ranged from 0.3 to 0.8 mg/l.

4. The lower Murderkill River should not be listed for dissolved oxygen, because DNREC

(a). has not demonstrated that the water segment does not attain water quality standards for DO,

(b). has not applied the water quality standard for DO correctly

The applicable standards were shown in the Methodology document. Results of upper confidence limit analyses were shown on a station by station basis. Four stations in the lower Murderkill showed upper confidence of the 10th percentile ranging between 3.1 and 4.3 mg/l, well below either the marine standard of 5.0 mg/l or the freshwater 5.5 mg/l criteria. A fifth station at Bowers Beach Wharf showed a 10th percentile concentration of 5.2 mg/l which was assessed as meeting the criteria.

5. DNREC has failed to explain its analysis procedures in a manner allowing stakeholders to verify that attainment decisions are based on scientifically defensible methods;

The Department detailed its procedures and the basis for them in the Draft Methodology document and in the final Document. The literature cited supported the methodology.

6. DNREC has not made the required priority ranking of impaired water quality segments and;

The Department has been working under a Consent Decree that proscribes the timetable for TMDL promulgation of waters listed on the 1996 303(d) list. The timetable was based on a rotating basin approach. As new waters are added to the list, most will be incorporated into the current TMDL schedule. Those waters and pollutants that would not already be under the Consent Decree schedule are tentatively added to the end of the schedule under the rotating basin time schedule.

7. DNREC has otherwise failed to conduct, document, and explain the proposed listing in accordance with applicable law, regulations and guidance.

The Department followed applicable law, regulation and guidance to develop and publish the Tentative List. The Listing Rationale clearly described the methodology and the Department has provided the commenter with relevant information and data in a timely manner.

Commenter U.S. EPA

(Editors note: These comments are extracted from comments on the Draft Methodology which was received December 2007 and comments on the Draft Core Documents received in March 2008.)

Comment 1: *EPA commends Delaware for planning to use five years of data in making the assessment determinations. This follows the recommendations of several of EPA guidance on conducting assessments for use determinations. The methodology also states that when adequate data is not available for an assessment unit, an "abundance of caution" will be used in making a use determination. It would be helpful to EPA if DNREC could clarify or elaborate upon how an "abundance of caution" will be applied.*

The Department uses five years of data to try to "smooth out" normal variability in environmental data. "Abundance of Caution" refers to a general approach of making protection of the resource the highest priority in assessments.

Comment 2: *Throughout the "What are the Components of an Integrated Report" portion of in the IRG, EPA outlines a number of expectations for waters listed in certain categories. These expectations in part include the establishment of a schedule for listing waters in Category 3, and the minimal data needed to support a listing in Category 4B. Delaware's assessment methodology makes no mention of such expectations.*

It is EPA's understanding that DNREC is planning on addressing waters that have been listed as impaired due to biology and habitat through "restoration plans." Once these restoration plans are in place, DNREC would place the water in Category 4B. Based upon this plan, EPA believes it is especially important at this time that DNREC document the minimal data and program measures needed to support a listing in Category 4B. For example, the methodology states that "other required control measures are expected to result in the attainment of WQS in a reasonable period of time." If the restoration plans are to be considered the control measure, DNREC needs to clarify in this document what specifically needs to be included in the plan, how commitments in the plan will be enforced, and the process for determining "reasonable period of time," at a minimum.

Listings in Category 3 and 4B are infrequent and by their nature require some flexibility to reach the overarching Clean Water Act goals or restoring water quality. The Department is working on data analysis, restoration plans and guidance internally and with stakeholders. As that work proceeds, assessment, listing methodologies and restoration plans may be updated and modified as appropriate.

Comment 3: *In "Categories of Nutrient Concentration" chart in this section, EPA notes that the Total Phosphorus levels have changed from the 2006 listing cycle. DNREC needs to provide a rationale for this change.*

Phosphorus levels were adjusted based on TMDL modeling efforts that showed the levels were protective in Delaware waters. No segments were delisted as a result of the changes.

Comment 4: *The assessment methodology for making assessment determinations was retooled for the 2006 assessment cycle. EPA agreed that DNREC could use this approach, with the minor modification that any data points that were taken on the same day for the same waterbody ID would be averaged before being included in the geometric mean calculation. As with the last listing cycle, EPA is concerned that the Summary Statistics chart will not contain sufficient information to assist us in our review of waters delisted based upon this method. Therefore, for those waterbodies previously listed for bacteria impairment that may be delisted during this listing cycle, EPA is requesting that DNREC provide us with the actual data used to determine the geometric means.*

In regard to the use of predictive models when closing beaches based on a rain event, the discussion appears to indicate that this tool is based on outdated criteria and will no longer be used in use attainment determination. Please confirm if EPA is making a correct interpretation of this discussion. This is identical to what was stated in the assessment methodology documents for the 2004 and 2006 reporting cycles. From the wording of the discussion, however, it appears that rainfall-based closures still occur. If that is the case, data is available showing impairment. Since that data, processed using the predictive model, shows impairment but the assessment model is outdated, EPA believes those beaches could be placed in Category 3. Also, it is not clearly explained if the predictive beach closure assessment method uses data from the previous five years or just the most recent year. Please indicate if Delaware is planning to initiate routine monitoring at those beaches or if the model will be retooled to reflect the new bacteria criteria.

The Department will provide data to EPA per the request. Rainfall based closures are management actions outside normal assessments. Delaware has an extensive beach monitoring program that is reported on the internet and frequently updated. There are TMDLs in place for pathogens throughout the State, including most monitored beaches.

Comment 5: *It is noted that in these methodologies there is no mention of toxics other than in the case of fish consumption advisories and ammonia. On that same note, there is no mention of attainment determinations based on physical/chemical methods other than Dissolved Oxygen and temperature.*

DNREC has indicated through others avenues that it monitors toxicants in its "Toxics in Biota" program. If so, the assessment methodology used with that data also needs to be articulated in this document in order for all reviewers to develop an understanding of your decision making process and to evaluate these procedures against EPA guidance and other acceptable protocols. This document is also silent in regard to monitoring and assessment activities relating to shellfish, public water supply, industrial water supply, agricultural water supply, and wetland use determinations. The final version of this methodology document should include a discussion of the State's process for assessing attainment of these uses.

Delaware has an extensive fish tissue monitoring program that uses state of the art risk assessment procedures. The program has resulted in widespread fish advisories across the state. There is little value in duplicating publishing the highly technical fish tissue advisory processes and procedures that are available elsewhere. Rather, the Department uses the final advisories for the assessments.

The Department has prioritized the primary contact recreation, aquatic life and ERES use assessments. At this time no methodologies have been developed for other use determinations. In addition, no comments by stakeholders have indicated that there is a possible impairment of the other uses.

Comment 6: *In 2004, Delaware changed the pollutant CALM code for Hoopes Reservoir (DE260-L01) to "3" noting that "This segment was listed in 1996, apparently based on earlier reports but no data were used for the listing. No data has been collected in the interim. The Department will study the segment to determine if a listing is appropriate." When does DNREC anticipate sufficient data will be collected to make a determination on this waterbody?*
The Reservoir has been under construction recently and sampling has not been occurring. In addition, it has recently come to light that the reservoir has been closed to swimming since the 1950s due to safety concerns. The Department will evaluate sampling and the designated use for the Reservoir in the near future.

Comment 7:*For McGinnis Pond (DE220-L01), EPA notes that bacteria was delisted in 2006 based upon attainment. In 2006, a Total Maximum Daily Load (TMDL) was approved by EPA for bacteria in the Murderkill River watershed, the watershed that includes McGinnis Pond. Please clarify if the TMDL includes allocations for McGinnis Pond that are required to meet the designated use. If so, the TMDL date should be included for this listing.*

The listing has been modified per the comment.

Comment 8:*For Abbotts Mill Pond (DE210-L06), EPA notes that bacteria was delisted in 2006 based upon attainment. In 2006, a TMDL was approved by EPA for bacteria in the Mispillion River watershed, the watershed that includes Abbotts Mill Pond. Please clarify if the TMDL includes allocations for Abbotts Mill Pond that are required to meet the designated use. If so, the TMDL date should be included for this listing.*

The listing has been modified per the comment.

Comment 9: *For bacteria in the Upper Broadkill River (DE060-003), the list indicates that a TMDL was approved in 2006, however, the Pollutant CALM Code is still listed as 5, as is the Overall CALM Code. Please indicate why Pollutant CALM Code remains 5.*

The listing has been modified.

Comment 10:*EPA received notice of this draft through an electronic mailing to stakeholders. In order to meet the public participation requirements, DNREC needs to provide proof of state-wide publication and opportunity to comment.*

A copy of the tear sheets for the advertisements will be enclosed with the cover letter and supporting documents.

Comment 11 :*TMDLs for PCBs in Zone 6 of the Delaware Estuary Basin was established in December 2006. The 303(d) list should be updated to include this information.*

The listing has been modified per the comment.

Comment 12:*EPA notes that Delaware is delisting 6 waters for bacteria due to attainment. EPA finds that the Summary Statistics chart does not contain sufficient information to assist us in our review of these delistings. Therefore, for those waterbodies that Delaware is planning to delist for bacteria impairments, EPA is requesting that Delaware provide us the actual data used to determine the geometric means. The waters in question are: Marshyhope Creek (DE200-001), Gravelly Branch (DE240-005), White Creek (DE140-001), Stockley Branch (DE140-006), Drawyer River (DE010-001-03), and Moores Lake (DE290-L01).*

An electronic spreadsheet of the requested data will be forwarded when the final document is submitted.

Comment 13:*EPA provided comments on December 14, 2007 on Delaware's "2008 Assessment, Listing and Reporting Methodologies Pursuant to Sections 303(d) and 305(b) of the Clean Water Act" but we note that no modifications were made based upon our comments. We are enclosing a copy of that letter with these comments so that Delaware can consider it further in finalizing its 2008 Combined 305(b) Report and 303(d) List Core Documents. EPA is particularly interested in the rationale for changing the total phosphorus levels that are used to implement the narrative provisions of the State's Surface Water Quality Standards for nutrient enrichment assessments.*

Comments 1-5 were from the earlier letter and have been responded to above.

Comment 14:*Delaware's assessment, listing and reporting methodology indicates that the State will incorporate Delaware River Basin Commission (DRBC) assessment data into its 303(d) list. EPA is aware that DRBC has not finalized its data, but that draft data has been made available. Please indicate how this data was considered in the development of the draft 2008 303(d) list.*

Delaware reviewed earlier DRBC assessments in conjunction with the 2008 draft list. No listing decisions were warranted based on the review.